AUGUST 1, 1955

NEWS ISSUE

Electrical World

Price 35 Cents

A McGRAW-HILL PUBLICATION

Canada Looks at 1958 and Sees More Steam Plants...

... But Hydro Will Retain Dominance

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Plastics Used to Splice Aerial Cable . . . Page 16

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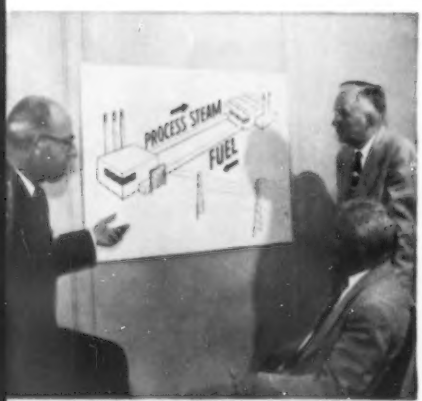
LARGEST TURBINE STEAM FLOW to date, 2,700,000 pounds per hour, will be one of many advances in the General Electric turbine-generator units for the Linden station. The model for the first Linden unit is viewed here by R. J. Stock and G. B. Cox, marketing engineers, of General Electric's Large Steam Turbine-Generator Department in Schenectady.

SALE OF PROCESS STEAM OFFERS HIGHER STATION AND SYSTEM EFFICIENCY



RESIDUAL FUEL FOR STEAM is one of many opportunities available to electric utilities for improving station and system efficiency—discussed here by C. W. Elston (Left), Manager—Turbine Engineering; R. Sheppard (Standing), Supervisor—Product Engineering; and D. J. McLane, Jr., Manager—Sales, Large Steam Turbine-Generator Department.

Low heat loss points up potentials for cutting costs

In planning for future loads, many electric utilities can profit from the advantages of the sale of steam or the trading of steam for fuel with other industries.

A recent example of the co-operative opportunity available is an agreement between Public Service Electric & Gas Co., New Jersey, and Standard Oil. In this arrangement, PSE&G's Linden plant will supply Standard's nearby Bayway refinery with steam required for refining. In return, the residues of Bayway's processes will be piped to the Linden station for fuel.

For this installation, two 225,000-kw General Electric extraction turbine-generator units will be used to produce both electricity and process steam. Since much of the waste heat will be used by the refinery, the heat rejected to the condensers will be less than one-half of that for a normal station. Fuel costs will be reduced further as a result of the station's proximity to the refinery.

While the number of industries where such reciprocation, on a practical scale, is relatively limited, the market for process steam itself is virtually unlimited. And, many electric utilities are finding that they can satisfy industry's need for steam at lower costs than industry can produce the steam itself. For more details on these potentials, contact your G-E Apparatus Sales Representative or write to General Electric Company, Section 301-285, Schenectady 5, New York.

MORE POWER TO AMERICA

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ELECTRICAL WORLD

Published weekly by McGraw-Hill Publishing Co., Inc., Executive, Editorial, and Advertising Offices: **McGraw-Hill Building, 330 West 42nd Street, New York 36, N. Y.** Publication Office, 99-129 North Broadway, Albany 1, N. Y.

Donald C. McGraw, President; Paul Montgomery, Executive Vice President; Joseph A. Gerardi, Vice President and Treasurer; John J. Cooke, Secretary; Nelson Bond, Executive Vice President, Publications Division; Ralph B. Smith, Vice President and Editorial Director; Joseph H. Allen, Vice President and Advertising Director; J. E. Blackburn, Jr., Vice President and Circulation Director.

Subscriptions: Address correspondence to Electrical World—Subscription Service, 99-129 North Broadway, Albany 1, N. Y. or 330 W. 42nd St., New York 36, N. Y. Allow one month for change of address.

Subscriptions are solicited only from executive, supervisory, and engineering personnel in electric utilities, manufacturing companies, and related fields. Position and company connection must be indicated on subscription orders.

Single copies 35c. For the United States and possessions and Canada, $6 a year, $9 for two years, $12 for three years. Other Western Hemisphere, and the Philippines, $15 for one year, $25 for two years, $30 for three years. All other countries, $25 for one year, $40 for two years, $50 for three years. Entered as second-class matter at the Post Office at Albany, N. Y. Printed in USA. Copyright 1955 by McGraw-Hill Publishing Company, Inc. Permission required to reproduce any of contents.

Electrical World

Published for 81 years for those engaged in the business of generating, transmitting, distributing, or applying electric power

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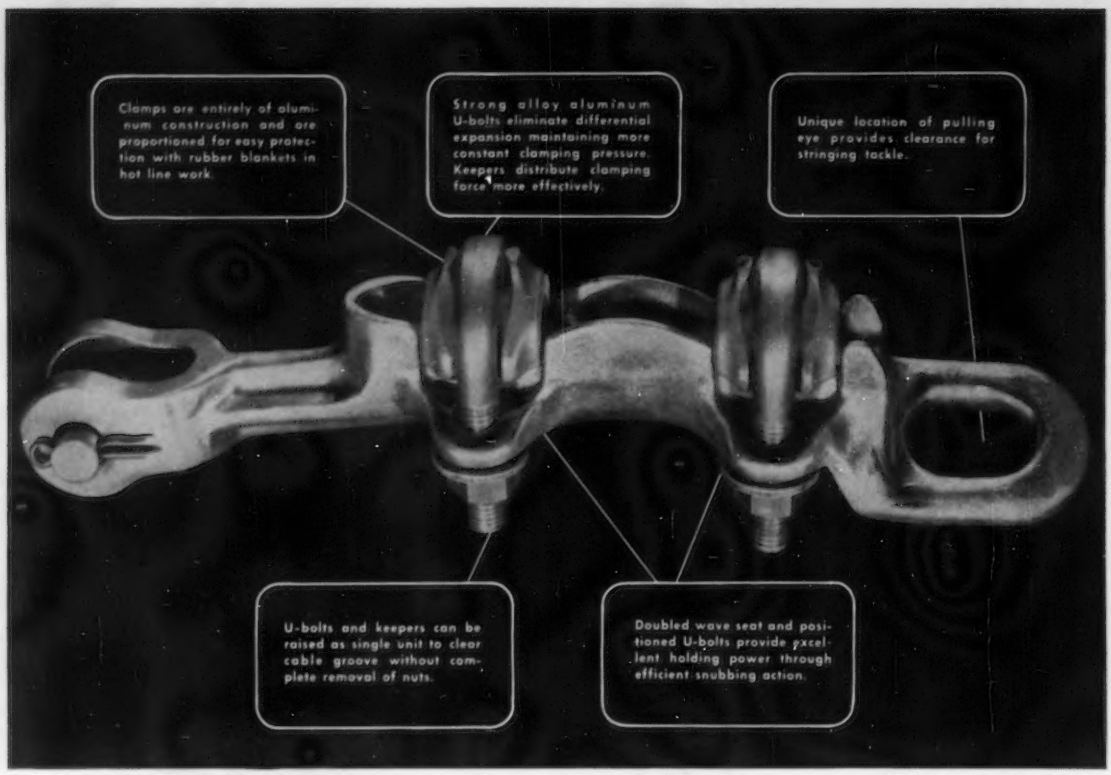
COMING NEXT WEEK—An issue that engineers will enjoy. Lead articles will range from European EHV practices to burying control cables. As usual there will be the many departments that serve our readers.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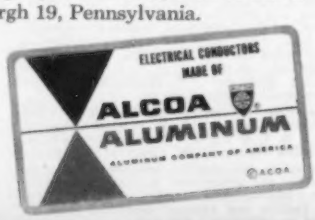
Your Guide to Aluminum Value



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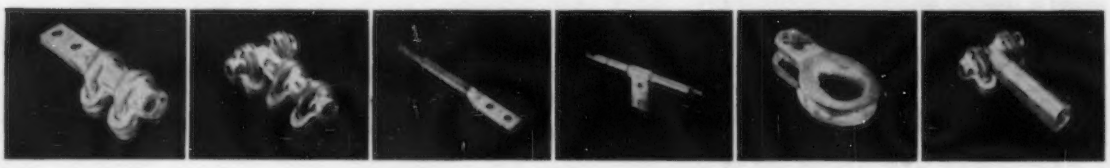


EDITORIALS

This Is the Time to Support ACTION

American cities today are becoming increasingly aware of the blight of slums. Throughout the country groups are becoming more and more active in setting out to eradicate these depressed areas. The time is ripe for electric utilities, especially those serving these areas, to get on the bandwagon of neighborhood improvement.

One concrete way of aiding this effort was pointed out at the Edison Electric Institute Convention in Los Angeles last month by Pres Elmer L. Lindseth of Cleveland Electric Illuminating Co. Lindseth is a director of the American Council To Improve Our Neighborhoods (ACTION) and chose to tell the EEI gathering about the contribution that ACTION is making. Another director of this group who is associated with the electrical industry is Roy W. Johnson, executive vice president of the Appliance and Electronics Group of General Electric Co.

ACTION, located at 2 West 46th St., New York, N. Y., is a non-profit, non-partisan group which is setting out to spearhead a national program of housing renewal. It estimates that an investment of $100 billion is required to eliminate slums and housing blight over the next ten years. To focus attention on the evils of housing neglect, it is launching a national information campaign to reach a peak early this fall. The Advertising Council, public service medium of the advertising industry, has accepted the ACTION program as one of its 1955 public interest campaigns.

ACTION hopes to accomplish its objectives by working through existing channels, and by:

- Gathering and providing facts upon which constructive action can be based.
- Generating citizen awareness and motivating individuals to take action.
- Providing, on request, specific assistance to communities that wish to improve their neighborhoods.

Lindseth told utility executives they could and should help by becoming associated with the ACTION program, by giving it all possible publicity and by giving it wholehearted financial support.

Utilities have a great deal to gain by helping ACTION to reach its objectives. They will be helping to stop a spreading blight which can only mean lost revenues. They will be helping to rehabilitate substandard homes. One aspect of this rehabilitation is to give greater attention to electrical needs. And utilities will be helping to replace useless buildings with new and livable housing better equipped for a start in electrical living.

Lindseth gave a hint of what the ACTION program might mean for electric utilities. If only 10% of the program is achieved, he said, it could mean the addition of 2 million ranges, 4½ million electric clothes dryers, and more than 2 million electric water heaters on the distribution lines of electric utilities. This could mean as much as $300 million annually in increased residential power sales for the utilities and $2 billion in increased potential sales for the appliance industry.

In its 1954 annual report Consolidated Edison Co of New York tells what is happening on a single block of substandard housing that is being replaced by a modern office building. It will derive $760,000 a year from the new building as compared with $22,000 a year from the former customers on the site. Admittedly this is not housing in the ordinary sense, but the principle is the same although the results would be smaller.

Utilities would do well to study their service areas and find where an ACTION program is most needed.

Give Us a Hand on Terminology

Over the past two months we have carried in "Readers Forum" responses to our May 2 Editorial, "We Told Them We Would Ask You." Letters have come from as far away as Mexico. A number of utility men here at home have spoken up on these matters of terminology that figure in our everyday work. We'll continue to print the responses as space permits because we believe standardized terminology is important to the industry.

For those of you who have strong opinions on these matters but haven't gotten around to writing us, here are the questions:

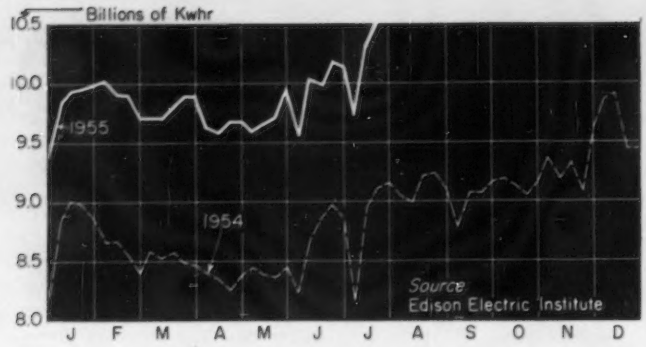
- Is the term "boiler" or the term "steam generator" more applicable?
- Do we need a more descriptive term for "heat pump" when selling to the general public? How about "electric air conditioning," or does that suggest only cooling?
- Which shall it be, "turbogenerator" or "turbine generator?"
- Is "adequate wiring" too stilted for general use? Would "wired for electrical living" give us more mileage or just a longer term?
- When expressing the ratings of boilers, or steam generators, should this be in "boiler megawatts," "pounds of steam per hour," or "Btu per hour?" If in Btu, should it be keyed to input or output?
- In dealing with large generating units or systems, shall we express capacity in "kilowatts" or "megawatts?" Similarly, what about using "megawatt hours" instead of "kilowatt hours" when talking in big numbers?
- Which is better, "nuclear power plant" or "atomic power plant?" Or what about "fission power plant?"

And here's one on metering practices:

- Why not read meters and bill customers in multiples of 10 kwhrs? Some argue it would save reading and billing time, cut down on the need for five dial residential meters.

Again we invite you to write your opinions to our Readers Forum Editor. Or if you have a pet peeve along these lines, we'd appreciate hearing about that too.

ELECTRICAL WEEK



OUTPUT
Week Ended July 23
10,620,000,000 Kwhr
UP 16.7%

Atomic Energy Commission requirements — 903,000,000 kwhr (Electrical World estimate). Excluding AEC, output increase was 11.2%

Per Cent Change From Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent.	Rocky Mount.	Pacific NW	Pacific SW
July 23	+16.7	+12.5	+17.1	+30.8	+6.3	+22.0	−3.6	+12.4	+11.1	+7.6
July 16	+16.6	+10.8	+14.1	+29.5	+6.8	+22.4	+4.6	+11.7	+12.0	+5.8
July 9	+19.2	+15.0	+19.2	+34.8	+6.9	+25.3	+5.8	+7.8	+13.2	+4.8

Seasonally Adjusted Index 201.5 Week Ago 202.1 Year Ago 173.8

The Issue's Highlights: Ohio Edison's Pres Walter Sammis urges Congress to maintain watchdog function over TVA and not leave TVA free to expand by revenue bond financing . . . Bill appropriating $14 million to start 11 hydro projects in South and West awaits Eisenhower's decision . . . Kefauver continues investigation of Dixon-Yates contract, hitting at White House order suspending SEC hearings on D-Y financing . . . At British Electrical Power Convention speakers and delegates were optimistic about progress atomic power is making (p 25). No handicap to this progress will be BCEA's announcement that rates will be raised because of rising cost of coal (p 44) . . . Canada foresees a slow down in growth of both load and capability.

Atomic Power: Kansas utilities have formed "Atomic Power Associates of Kansas" to keep abreast of atomic developments in power generation and to consider possibility of building atomic power stations in the state. Members are Kansas G&E, Kansas P&L, Kansas City P&L, Empire District Electric, Western Light & Telephone, and Central Kansas Power. KG&E also announces it has joined Foster Wheeler, Pioneer Service & Engineering, Diamond Alkali Study Group . . . Canada's powerful Chalk River atomic reactor has been put out of action for several weeks due to a mishap involving contamination of a heavy-water pile.

Atomic Power in Britain: Babcock & Wilcox has been awarded contract to supply all three heat exchange systems for three additional dual purpose nuclear power-plutonium producing plants Britain plans to build immediately. Contract totals about $17 million . . . Britain's contribution to Geneva Atom Conference will include exhibits by 40 firms (compared with 22 from U. S.), and presentation of 67 papers by 200 scientists and executives from some 100 firms . . . As result of their work in atomic energy, British stock market reports note "amazingly anticipatory reactions on the market" by: English Electric, Babcock & Wilcox, Taylor Woodrow, Head Wrightson—to mention a few of the 150 companies associated with nuclear work.

Westinghouse Electric last week announced that it had signed to sponsor complete and all-inclusive TV and radio coverage of the 1956 elections as well as both political conventions on the CBS system. . . . Westinghouse reports second quarter net income increase of 30% over first quarter but still below second quarter year ago. Pres Gwilym A. Price said net was $16.6 million (98¢ a share) compared with $12.8 million (75¢ a share) in first quarter and $19.1 million ($1.15 a share) a year ago. Net sales billed in second quarter totaled $388.3 million compared with $367.7 million previous quarter and $405.2 million year ago. Price said backlogs have increased from first of year and total 1955 sales are expected to approach 1954 record.

NEWS OF THE INDUSTRY BRIEFLY TOLD

Off the Washington Wire: AEC's 8th semiannual report indicates broadening of reactor development program to include building of several new types. AEC says all types in its 5-year plan show promise of competitive power production. Other highlights: California Edison will soon buy heat and make electricity at North American Aviation's sodium-graphite plant; promise of economic power generation has been shown for liquid metal-fueled, organic-moderated and small homogeneous reactor types . . . Upper Colorado River Project is dead until next year, at least. House sponsors dropped it when vote poll showed it faced certain defeat . . . Testimony in Senate hearings brought about agreement between Administration supporters and pro-TVA Democrats on geographical limitation of TVA power system. . . . Senate Public Works Committee has postponed until next year action on legislation giving New York Power Authority right to develop Niagara River power.

Pacific Northwest: Pacific P&L has asked FPC for preliminary permit for five-dam, 325,000-kw hydro project on Lewis River and four tributaries in Southwestern Washington . . . House Public Works subcommittee has postponed until next year further action on John Day Dam partnership proposal. At brief hearing, Assistant Army Secretary George H. Roderick made strong plea to permit Pacific Northwest utilities to finance project in exchange for power from it . . . Kaiser Aluminum & Chemical and Douglas County (Wash.) PUD will study possibility of hydro dam at Wells on Columbia River, just below Chief Joseph Dam.

NEMA has asked House subcommittee to defer legislative action which would require inside safety latches on household refrigerators until they can develop a practical and economical model. Association also asked that users be made more responsible for discarded refrigerators. . . . In another action NEMA urged President Eisenhower to invoke Taft-Hartley in copper strike.

Kansas City P&L and IBEW-AFL agree to a 5% wage increase, retroactive to July 1 . . . San Diego G&E has been granted $4.3 million a year rate increase, upping return from 4% to 5.9% . . . New York City has raised rates for under-street transformer space to Consolidated Edison $400,000 a year . . . Massachusetts House of Representatives has defeated bill calling for legislative investigation of Lowell Electric Light.

ABOUT PEOPLE IN THE INDUSTRY

One of busiest men in the industry, Philip Sporn, president of American G&E, has just added to his already long list of offices the presidency of Nuclear Power Group, Inc. This is formally incorporated group of same name which is sponsoring construction of 180,000-kw nuclear power plant on Commonwealth Edison's system. Contract has just been signed with GE for plant, said to be largest all-nuclear plant yet planned. It will be completed in 1960. New group will carry out research and developmental part of construction.

Pres Kinsey M. Robinson of Washington WP is being cautious about latest campaign by Puget Sound P&L Stockholder's Committee for merger of Puget and WWP. "We've been taken down the aisle before and the groom ducked out the vestry door," says Robinson. Previous merger negotiations, in which Puget management backed down at last minute, cost WWP "eight months' hard labor and $400,000 in expenses," Robinson notes. This time he will not act unless definite plans are offered to him personally, he adds.

More News About People page 36

Sammis Scores TVA Financing In Senate Unit:

- **Congress' control over TVA operation, expansion would be impaired by plan**
- **Destruction of investor-owned companies in area could be result if no regulation**
- **Bond payments would be based on huge outlays of interest-free federal money**
- **Correction of inherent tax, interest inequities would be impeded, perhaps barred**

Private utilities got in their licks early as a pro-public power Senate group recently took the first step in a big push to eliminate Congress' reins on Tennessee Valley Authority's spending.

The utilities' case against authorizing TVA to issue its own revenue bonds to finance steam plant construction was presented by Walter H. Sammis, president, Ohio Edison Co and a former president of Edison Electric Institute.

The keystone of Sammis' argument is that Congress should continue its watchdog function over TVA operations, rather than permit the agency to expand its steam operations through bond financing. He testified before a Senate public works subcommittee:

- The proposal to grant TVA bond authority would impede if not permanently bar corrections of the tax and interest inequities inherent in TVA's electric operations.
- Congress intended when it created TVA to maintain a primary and enveloping authority over the new agency. "This is the only way Congress can assure itself that TVA fulfills the purposes for which it was created and that it does not encroach on the service areas of regulated and tax-paying utilities outside its zone of operations or drain off industries from other states through the creation of large and constantly expanding blocks of subsidized power," Sammis said.
- The only source of funds with which to pay interest and principal of TVA bonds would be from sale of electricity. These funds would be based on huge outlays of federal money, furnished interest-free by Congress.
- "TVA, as an unregulated monopoly," Sammis declared, "could ultimately destroy investor-owned companies now serving the areas to which TVA might expand."

Sammis crystallized the meaning of the proposal to give TVA bond authority. He said, "Whether or not TVA, as it presently exists, is a proper function of the federal government may not be relevant to the present proposals. The real question today concerns itself with an expansion or increase of TVA's operations, which is completely tied into the question of additional capital."

TVA Power Chief Gabriel O. Wessenauer testified earlier in support of the bill (S-2373) before the subcommittee. This legislation, sponsored by Subcommittee Chairman Robert Kerr (D-Okla.), embodies the plan suggested by the TVA board, a plan which would give the power agency almost unlimited authority to finance its future construction program with bond revenues.

The Senate group is not considering at this point a revision of this plan suggested by the Budget Bureau. The Budget Bureau's proposal, which would give the President and Congress veto power over TVA projects and bond issues and set a ceiling on the amount of bond indebtedness, has been introduced in the House but not in the Senate. The House has broken off plans for hearings this session.

Hydro Projects Await Ike's Decision

Construction of 11 new power projects in the South and West, for which Congress has appropriated $14 million to start, now hinges on whether or not President Eisenhower can be convinced they are feasible and economic.

Ultimate cost of the 11 projects is estimated at $777.6 million (see table). They would contain a total of 1,124,000 kw of initial installed capacity, with provisions for an ultimate total of 1,436,000 kw.

All are authorized projects. Congress has come through with enough first-year money to satisfy the engineers. But there are two kickers in the deck:

- Eisenhower, although he signed the bill, has indicated extreme displeasure at Congress' insistence on granting money to these and 100 nonpower federal construction starts. He asked for only 36 in his fiscal 1956 budget message, and one of these (deepening of the Delaware River) was dropped.
- Appropriation of initial construction funds does not guarantee that Congress will later appropriate sufficient funds to complete any of the projects.

Eisenhower's opposition to the high number of new starts is based partly on economics, partly on the fact that money for federal starts rules out partnership plans, and perhaps partly on personal pique at being overruled.

He warned, on signing the money bill, that ultimate cost of all 111 projects would run to more than $1.5 billion, a troublesome sum to economy-minded Administration officials who are trying to tighten up the budget.

He asked that only one of the power projects be authorized as a partnership venture. This is Cougar Dam, in Oregon, with a 25,000-kw plant.

The Army Corps of Engineers is delighted, of course, with Congress' acceptance of its plans for the new projects. However, they view realistically the uncertain prospect of getting future appropriations to complete them. They've drawn up cost allocation and construction schedules, but they don't like to discuss these for fear they'll have to change them if Congress tightens up on its purse-strings next year or the year after.

Projects Covered in 1956 Appropriations Bill

Project	Ultimate Total Cost (000 omitted)	First Year Appropriation (000 omitted)	Initial Capacity (kw)	Ultimate Capacity (kw)
Army Corps of Engineers:				
Dardanelle Lock and Dam..	$94,600	$450	120,000	120,000
Hartwell Dam	94,300	3,000	198,000	330,000
Eufaula Dam	153,000	450	90,000	90,000
Cougar Dam	37,400	500	25,000	25,000
Hills Creek Lock and Dam..	32,300	310	30,000	30,000
McGee Bend Dam	45,700	1,500	45,000	45,000
Ice Harbor Lock and Dam..	135,000	1,000	270,000	450,000
Ft. Gaines Lock and Dam..	86,400	1,800	130,000	130,000
Sub Total	$678,700	$9,010	908,000	1,220,000
Bureau of Reclamation:				
Yellowtail Dam	$95,000	$4,000	200,000	200,000
Deer Creek Power Plant....	1,000	325	5,000	5,000
Roza Power Plant.....	2,900	475	11,000	11,000
Total	$777,600	$13,810	1,124,000	1,436,000

FPC Hits Gas Import Snag

Pacific Northwest Pipe Line Corp's plans to import natural gas from Canada recently hit a momentary snag at Federal Power Commission hearings when the company suddenly found itself without a customer.

The FPC is determining whether Pacific Northwest should be allowed to purchase 300,000 mcf of Canadian gas daily from Westcoast Transmission Co, Ltd. Gas, so obtained, would supplement that which the northwestern states will receive from Pacific Northwest's pipe line to San Juan Basin, already approved by the FPC.

The snag developed when El Paso Natural Gas Co, which had planned to buy most of Pacific Northwest's Canadian Gas, was caught in a squeeze play by one of its customers, which opposed using Canadian gas.

El Paso appealed to Pacific Northwest to allow it to buy from the San Juan sources, but Pacific Northwest said no. Pacific Gas & Electric, the unhappy El Paso customer, was equally adamant in refusing to buy the Canadian gas.

As half a dozen motions were filed in divided efforts to try to unsnarl the tangle, an FPC examiner quietly began hearing evidence from Westcoast and Pacific Northwest. When the presentations ended, Pacific Northwest appeared to have its money on a new proposal—that it could drop El Paso and sell an equal amount of gas to its own northwestern markets.

Navy Generators Bolster Puerto Rican Power Pool

The U. S. Navy's floating power plant recently tied up in San Juan, P. R., to supply an additional 30,000 kw to the Commonwealth's overtaxed power pool. The three barge-mounted generators are being leased to the Puerto Rican Water Resources Authority for $800 per day. The contract runs until Dec. 31, 1955.

In the same area, Representative Carl Vinson has proposed turning over the generating facilities of the Marine Corps and Navy Submarine Base at St. Thomas to the Virgin Islands Corp. Vinson specified that power would be furnished to the services at cost by VICORP, a federal backed development agency operating power facilities for Virgin Island municipalities.

Dixon-Yates Probe Continues

Senator Kefauver's subcommittee wants Presidential Assistant Sherman Adams to testify but he declines invitation

Although earth-turning at the Dixon-Yates plant site at West Memphis has ceased, the probing and digging continued on Capitol Hill in Washington.

Democrats in the Senate went right to the White House in their search for evidence to prove their contention that the contract was a put-up deal.

They called on Presidential Assistant Sherman Adams to come before their Senate judiciary subcommittee to explain why he asked for postponement of still-unfinished Securities and Exchange Commission consideration of Dixon-Yates financing. Adams declined the invitation. SEC Chairman J. Sinclair Armstrong had told them Adams asked for a recess in hearings just as the House Appropriations Committee was getting ready to vote on funds to build a transmission line to connect the Dixon-Yates plant with TVA system.

To the Democrats, the implication was that Adams wanted to let the House members vote before any testimony could be brought out at SEC which could indicate a tie-in between Administration officials, negotiating the Dixon-Yates contract, and Wall Street.

The very Wall Street bankers the Democrats are trying to connect with the contract have denied that there was anything improper about their actions in advising the Budget Bureau on the contract while it was being negotiated. They've admitted pre-contract discussions with Administration officials, but they've testified that these talks were concerned with the financial aspects of the then-pending proposal and that their advice was solicited by government officials.

Sen Estes Kefauver (D-Tenn.), pro-TVA Democrat conducting the hearing, pressed Adams to appear. He hinted that Adams was trying to suppress evidence by refusal to testify.

Wenzell Remains in Spotlight

Sen Clinton P. Anderson (D-N. M.) announced on the floor of the Senate that he had access to a April 3, 1954, Atomic Energy Commission memorandum which, he said, proved Adolphe Wenzell, New York banking official, was "told to negotiate with Dixon-Yates."

The memorandum actually reported that Wenzell was advised by former AEC General Manager Kenneth D. Nichols that "it appeared the Dixon-Yates people were now getting within the range of possible discussion" and suggested that Wenzell "encourage the Dixon-Yates group to refine their figures and come up with a proposal."

At that point in the contract's history, AEC and the Budget Bureau were searching intently for a way to boost generating capacity in the Tennessee Valley area without pumping more federal money into the sprawling TVA steam plant system.

Wenzell's attorney, Arthur Dean, pointed out that Wenzell was never an officer of the government, and that his company was not at that time involved in the contract, though it did later handle Dixon-Yates financing.

The Joint Congressional Atomic Energy Committee, also investigating the Dixon-Yates contract last week, asked AEC officials in a closed session why the role of Paul Canaday, a vice president of Middle South Utilities Co, had been omitted from the records. AEC members reportedly replied that Canaday was covered in the record by a statement that Dixon-Yates officials had appeared at numerous meetings.

As probing continued, White House awaited the result of a study of the contract's provisions by the General Accounting Office. The GAO has been directed to determine whether the government is liable for cancellation payments to the Dixon-Yates firm, and if so, for how much.

Private Atomic Parts Plants Unveiled

The first privately financed atomic parts manufacturing plant was unveiled recently to the press by Westinghouse Electric Corp. "Canned" motor-pumps for hermetically sealed nuclear power plant systems are presently in production, and high-pressure and high-temperature valves for the primary loop of nuclear systems will be manufactured shortly. The plant, located at Cheswick, Pa., also includes an instrumentation laboratory for development of reactor controls.

Hot Issue in Phoenix: Home Air Conditioning

Keeping cool in Phoenix, Ariz., is making some people hot—under the collar.

As a result, the City Council has been listening to a lot of arguments, for or against, installing air-conditioning equipment in side yards.

The Council proposed an amendment to zoning ordinances that would permit side-yard installation of refrigeration air conditioning equipment—provided it was set back two feet from the property line.

The air-conditioning industry endorsed the ordinance, maintaining that existing ducts in many homes would have to be remodeled extensively for back-yard installation.

But the ordinance has precipitated a storm of protest from home owners who maintained that side-yard installations would put noisy equipment too close to neighbors and would be a nuisance.

Some property owners blamed their sleepless nights on the whirr of side-yard equipment installed in their neighbors' bedrooms.

here's where insulators come to life

Useful insulator life starts with "clipping-in." Performance is evaluated from this time on. As time passes, the insulator quality (or lack of it) becomes apparent.

Well over 30 years ago transmission conductors were clipped-in to O-B cap-and-pin suspension insulators, basically similar to those shown here on a 330-kv structure. Where those lines are still in service, those insulators are still in use.

Younger O-B units are establishing similar records just as fast as time permits!

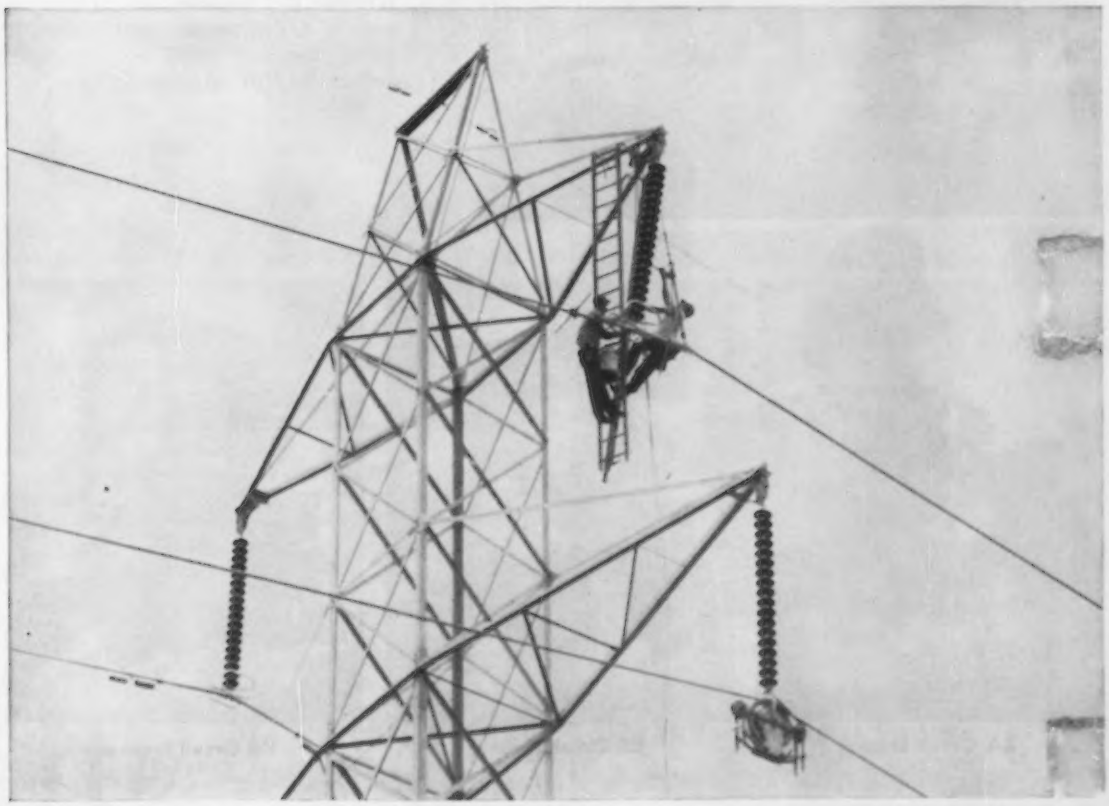
Because this sort of O-B performance is a matter of record throughout the power utilities industry, O-B insulators have been chosen for every extra-high voltage transmission system now operating or under construction anywhere in the Americas!

OHIO BRASS COMPANY • MANSFIELD, OHIO

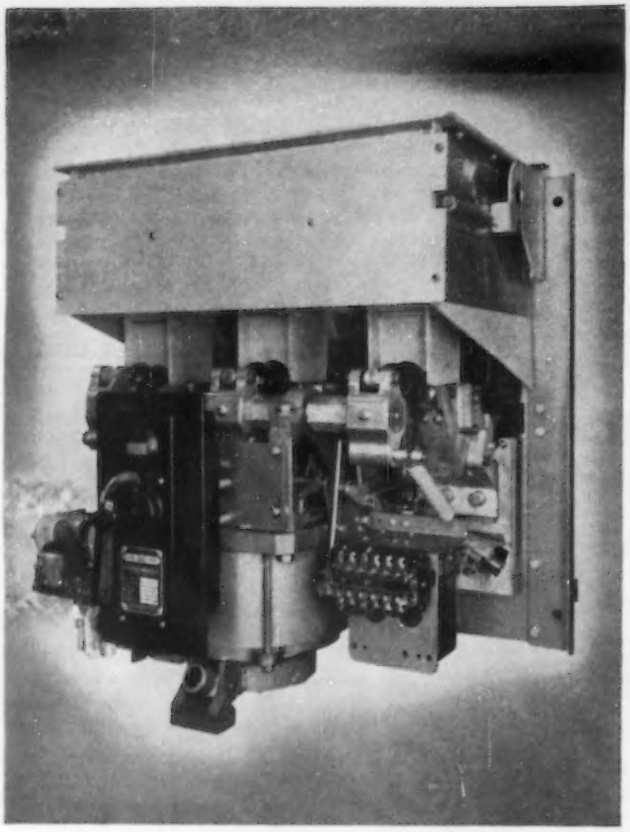
Builders of this 330-kv line could not select insulators and allied hardware at random, allowing an uncertain future performance pattern to develop; not with service continuity of a huge power block at stake. Because they couldn't leave performance to chance, they chose the O-B insulation shown here.

Ohio Brass

4545-H

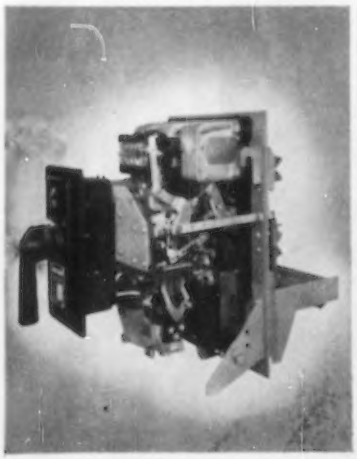


News of new developments in

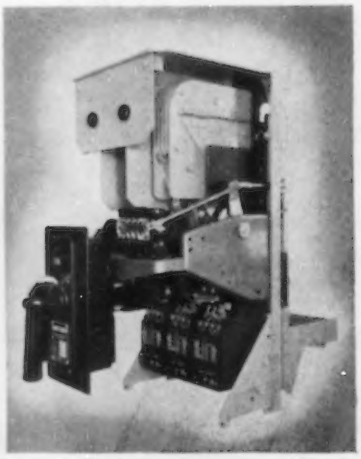


K line of circuit breakers now made through 3000 amp continuous, 75,000 amp interrupting at 600 v a-c

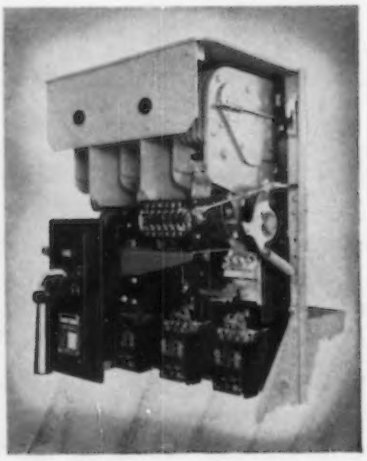
The new Type KD Air Circuit Breaker extends I-T-E's established three-high line of K breakers. It is an extremely compact metal panel breaker which incorporates the proved performance and generous safety factor of the KA, KB and KC breakers. As an integral part of I-T-E switchboard design, it offers the additional advantage of accessibility in minimum space.



KA Circuit Breaker



KB Circuit Breaker

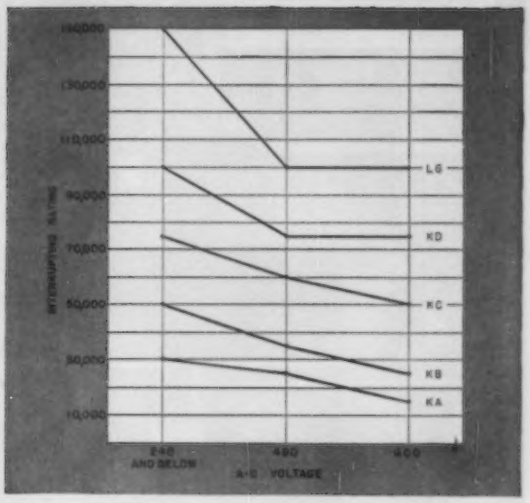


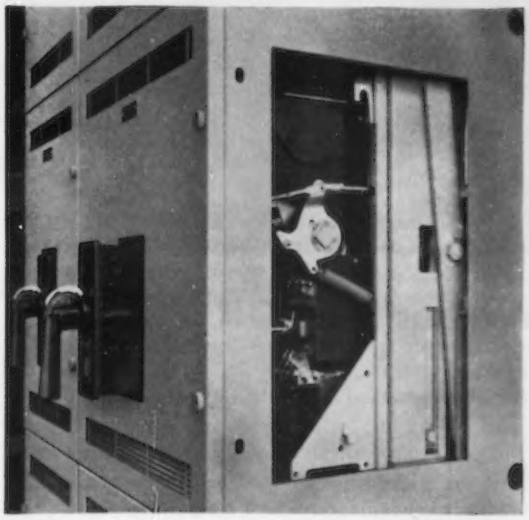
KC Circuit Breaker

I-T-E Low Voltage Switchgear

Circuit breaker interrupting ratings increased in keeping with proposed industry standards ▶

You save, because these standards reduce switchgear costs by permitting the use of lower interrupting rating breakers for short circuit protection in 240 v a-c and 480 v a-c systems. And with smaller breakers you save space, too. Uprating of I-T-E Types KA, KB, KC, KD and LG Air Circuit Breakers is shown in the accompanying chart.





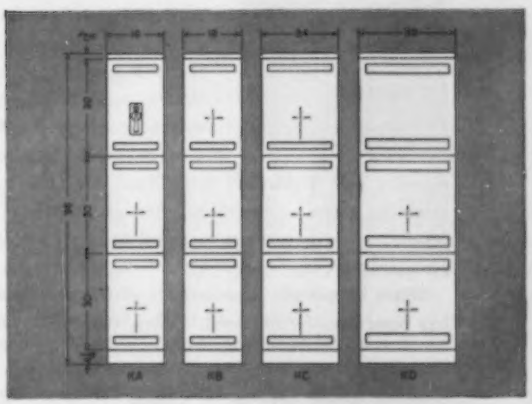
◀ Test position with doors closed now standard on new switchgear

Test position with no increase in over-all switchgear depth! This facility is by far the most convenient, most compact design on the market. It is an exclusive with I-T-E Switchgear, yet it costs no more. Additional advantages are increased safety, reduced maintenance, improved cleanliness, easier circuit identification.

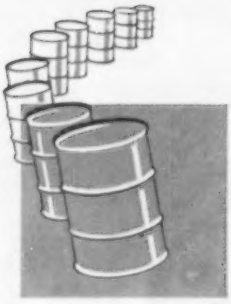
New compact breaker design saves space ▶

All I-T-E Type K Circuit Breakers can now be assembled three-high. KA, KB and KC frame widths remain the same as before. However, the new KD breaker is 6 in. narrower than the old LG frame, and can be arranged in a three-high compartment, space being thus provided for instrumentation in the same frame.

For complete information, contact your nearest I-T-E field office. Or write I-T-E Circuit Breaker Company, 19th and Hamilton Sts., Phila. 30, Pa.



I-T-E CIRCUIT BREAKER COMPANY · Switchgear Division



Trading Water for Oil

In Southern Illinois, over twenty oil companies have wells in the 10,000 acre Lake Centralia-Salem oil field. When production in this field dropped off, these companies banded together and decided to water-flood the field by pumping water underground through former oil producing wells to force more oil to move to the remaining wells.

What happened? The amount of oil produced has been greatly increased. Today, one well that formerly produced only 5 barrels of oil a day now yields 650!

Up to 130,000 barrels of water a day are pumped into the oil field, yet with the help of automatic devices and pushbutton control, the entire operation of the field takes only a handful of men. Electric power is at work, much of it supplied through the 2500 kva Wagner transformer, shown in the foreground above, that supplies power for equipment in the injection pump house.

Wherever electric power is used, Wagner transformers efficiently and dependably handle their never-ending job of supplying proper voltages for every purpose.

Let a skilled Wagner engineer discuss your transformer needs with you. Call the nearest of our 32 branch offices or write us direct.

Wagner Electric Corporation
6456 Plymouth Ave., St. Louis 14, Mo., U.S.A.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

WT55-7

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES • AUTOMOTIVE BRAKE SYSTEMS-AIR AND HYDRAULIC

Vancouver's tallest will be . . .

BCE's New Office Building

Construction of Vancouver's tallest ultra-modern sky-scraper (model shown above) began recently following award of contract for British Columbia Electric Co's $6.5-million, 21-story glass-and-enamelled-steel office building.

The main purpose of the new structure is to bring under one roof all BCE's present departments now scattered about the city. Design for the building was developed by Tom Ingledow, BCE vice president and executive engineer, together with a team of company engineers and Vancouver architects headed by Ned Pratt of Sharp and Thompson, Berwick, Pratt.

The building, expected to be completed by early 1957, will accommodate 1,200 office workers. Space for expansion has been reserved at the rear of the structure.

Unique architectural features include the following:

- Doubled pane glass, forming outside "skin" of the building, will provide insulation against the sun's rays and make for more efficient operation of the air-conditioning system.
- Venetian blinds, invisible from the outside and made of tiny bronze slats, will be inserted between the two slabs of glass making up the thermopane. The blinds will move at the flick of a switch.
- The building will be set back from the property line on all sides, with only 75% of the lot area utilized, to avoid "canyonizing" adjacent streets. Above the third story, a tower with 19 floors will occupy only 25% of the total lot area.
- A central service-core design assures sufficient light for working areas with all desks located no more than 15½ ft from the windows.
- A network of built-in devices in floors and ceilings for easy installation and removal of walls provide great flexibility in office arrangement.
- Electric cables will heat outside drives and sidewalks so that snow and ice will not become a winter problem for the building's occupants.

NPPA Points Up Accord With Hoover Unit Report

Northwest Public Power Association has hailed the Hoover Commission recommendations for creation of a regional corporation to develop Columbia river hydroelectric resources as a boost for NPPA's own plan for a regional public electric corporation with utility responsibility.

The Association's current Bulletin, edited by executive secretary Gus Norwood, plays prominently the Hoover proposal. It notes that the "surprise endorsement" followed by a year, the Portland, Ore., hearing of the Task Force on Water Resources and Power at which the Association filed a 21-page brief based on its own ideas for a regional organization.

NPPA's account notes the Commission strives to get the U. S. "out of the power business" but takes a realistic view of power in relation to navigation, irrigation, and flood-control benefits of river projects. Consequently, NPPA states, the Commission recommends seven regional corporations.

The Bulletin insists the Hoover report is "loaded with private utility propaganda against the preference clause" and other factors. "Nevertheless, the recommendations for regional public electric corporations may prove to be an important turning point," the Bulletin asserts. And it concludes: "Assuming that the Hoover Commission has been in close touch with Administration officials, the report may be evidence of a shift to a more palatable federal power policy for use in the 1956 campaign."

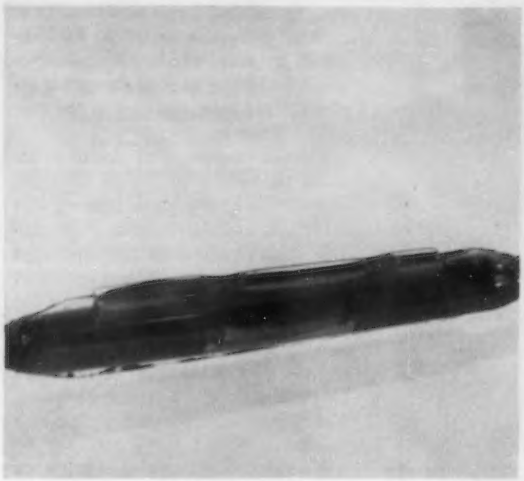
NPPA's plan is currently being redrafted again in legislative form and is expected to be submitted to Congress next year.

Wyoming Unit Resolves Utilities Pay Relocation

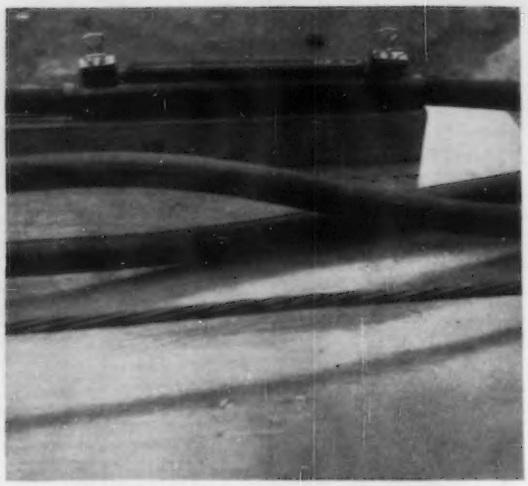
The Wyoming Highway Commission has approved a resolution urging that utilities be required to pay their own expenses for moving power and telephone lines along rights-of-way of federal-aid highways.

The compromise highway bill introduced in the House recently contains a provision that the federal government shall pay part of the cost of relocating utilities necessitated along highways and receiving federal aid for construction (EW, July 25, p 79).

Commission Secretary Thurman Sherard explained the Wyoming Commission felt power and telephone companies should be required to pay their own relocating costs freeing more federal money for actual construction work.



1. **INEXPENSIVE MOLD form holds plastic till it gels. Gel time is 10 to 20 min depending on air's temperature**



2. **STANDARD CONNECTOR is pressed on to ends of cable. Then mold form is centered about connector**

Plastics Used to Splice Aerial Cable

DISTRIBUTION
Construction

Material costs little, can be applied in short time, and provides good insulation. Average man can learn to use in day

L. **FALKENSTEIN,** Engineer, Outside Plant Bureau, Electrical Engineering Department, Consolidated Edison Co of N. Y., Inc New York, N. Y.

Approximately 50 plastic insulated connections are in service in the self-supporting aerial cable installations of the Con Edison system in the general area of New York City. Operation is at 2,400Y/4,000 v.

Although very little experience with these connections can be cited, they have so far given satisfactory service.

Laboratory Results . . . Facts gathered from tests prior to installing these plastic insulated connection are:

1. Moisture absorption at room temperature after 24-hr immersion was less than 1%.

2. Cable oil absorption at room temperature after 24 hr was less than .05%.

3. On a voltage breakdown test in accordance with the Standard Cable Step Test Method on 5-kv cable, test voltage was carried to 52 kv in one particular case before cable failure. In no instance did the plastic insulation fail.

4. No indication of bond failure was observed between the cable insulation and the plastic material of the connector under cyclic heating. Cable was heated to normal operating temperature then cooled in water for a total of 60 cycles.

5. Weatherometer tests indicated very little effect of ultraviolet and rain exposure from what may be considered more than five years exposure to conditions in a New York area.

6. Surface and volume resistivity was well over 100,000 megohms.

7. Breakdown voltage per mil in ⅛ in. thickness of material, when tested under oil, was 300 v minimum. Some materials have a 600-v per mil minimum.

Underground and higher-voltage experience have not been obtained in the field, as further laboratory study is prerequisite to any trial of such applications.

Material Used . . . Plastic materials considered for insulation purposes fall into the following general groups, or combination of groups:

1. Epoxy
2. Thiokol
3. Polyester
4. Polyamid

Epoxy materials have very good dielectric properties but are very brittle when cold. Addition of thiokol improves their mechanical strength but lowers the dielectric properties. Best combination contains 50 to 60% epoxy by weight, the remainder being thiokol, and catalytic and accelerator chemicals.

Epoxy-polyester and epoxy-polyamid combinations appear to have desirable characteristics deserving further consideration and possible use on higher voltage equipment.

Epoxy-thiokol materials are purchased as two liquid resins in separate containers correctly apportioned to form the desired insulation within a short time after mixing. There is no apparent deterioration of the material in the

3. **RESIN is poured in form about cable connection when mixture is warm. Tape prevents leakage at the ends**

4. **SEMI-PLASTIC MATERIAL squeezes from mold if binding wire is pulled too tightly about cable connections**

separate containers, and the viscosity of the separate parts allows easy mixing.

Training . . . In training men to use the plastic material experience indicates that the following procedure must be stressed:

1. Cable insulation must be cleaned of wax and roughened to give tooth for the plastic material to grip the cable insulation.

2. Cable connection must be centered in the mold form.

3. Resin liquid must be sufficiently low in viscosity to release bubbles before pouring.

4. Cable should not be moved when the resin starts to set into plastic (10 to 20 min after mixing at average room temperature).

5. Binding wire should not be pulled so tightly about the connections that semi-plastic material squeezes from the mold.

An average workman can learn these few points and obtain the feel of the material in approximately one day's time.

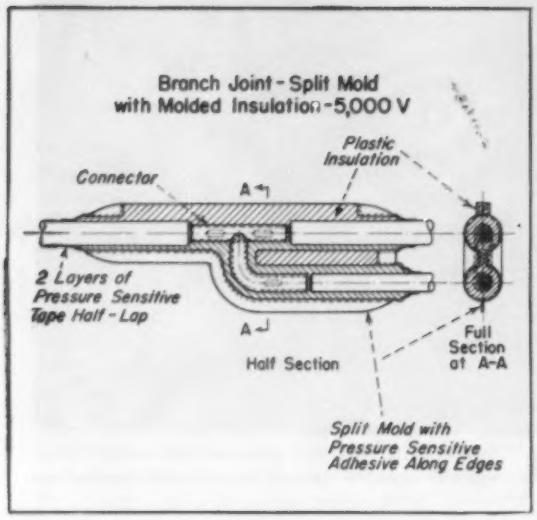
The 50 plastic connections cited have required about ½ man-hour for every three connections. Experience with conventional methods indicates that about 3 man-hours are required for three connections. As the base materials cost approximately the same, there has been a saving in favor of the plastic.

Branch Tap Easier . . . Even the most difficult of tapping jobs, the branch connection, has been made easier with the plastic material. Forms, such as "Y" and "T," are not

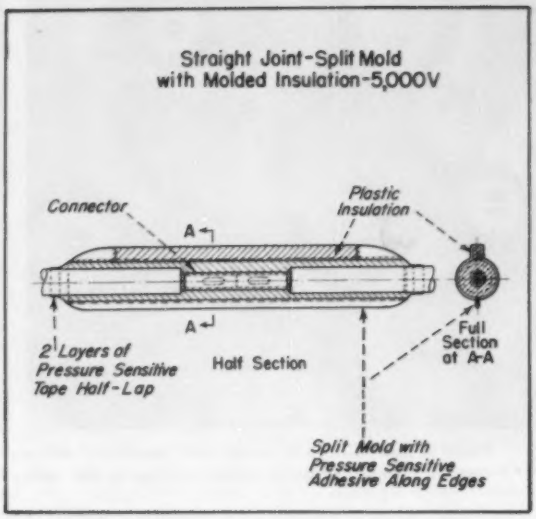
(*Continued on next page*)

Table I—How to Make a Plastic Splice on a 5-kv Self-Supporting Aerial Cable

1. Cut and fit cable ends.
2. Remove insulation from cable ends just far enough to meet the connector. This method differs from the taping operation in that normally ½ in. of exposed copper conductor is left between connector and cable insulation. This must be penciled to allow a good taping operation. Penciling of the cable insulation is not required for the plastic method. Should an unintentional space be left between connector and cable insulation, exposed cable conductors should be covered with two wraps of ozone-resisting rubber tape to prevent air in the cable strands from being displaced by the liquid resin and the displaced air from forming a bubble in the plastic insulation.
3. Press the connector on to the cable ends. This operation can be performed by a relatively inexperienced man using a pressure tool that will not release from the connector until the proper pressure and deformation has occurred in the connector.
4. Clean and roughen insulation of cable to a distance of approximately 6 in. from connection.
5. Place the form to contain the liquid resin until it solidifies about the connection. Be careful to center the electrical connection within the form. The cable and connector section must be straight so that the exposed conductor can be easily centered.
6. Edges on the halves of the form are provided with pressure-sensitive material. Press the two half forms together to prevent leaks of liquid resin before it hardens. Bind the ends of form with pressure-sensitive
7. Mix the two resin parts together for about 1 min and tape to prevent leakage.
   let stand until warm to the back of the hand.
8. When the mixture is warm to the hand (about 3 min) pour into form about the cable connection.
9. Strap the pouring spout of the form with pressure-sensitive adhesive tape to prevent deformation by heat developed by chemical action between resin parts.
10. When the resin has congealed into a mass holding its shape, the supporting strap holding the cable sections to the messenger wire may be wrapped around the cable and the cable made ready for service.



BRANCH TAP can also be made with plastic splice. Room to allow use of crimping tool is the only space requirement



CONNECTION MOLDS are inexpensive and are therefore left in place to provide additional amount of weather protection

Plastic Used As Splice Material

(*Continued from previous page*)

necessary with plastic material. Plastic insulated cable branch joints have been so made that the branch connection leaves the main cable parallel to it. Room for application of the pressure tool for crimping the connection in place is the only space requirement. This form of connection makes a neat job and takes up very little space as indicated in the illustration above.

Molds Inexpensive . . . Mold forms being inexpensive are left in place. Material for the forms (cellulose-acetate-butyrate) adds strength to the insulated joint and forms a good weathering surface about the insulation which, in itself, has good weathering properties.

Development and improvement of plastic material for insulation purposes is progressing rapidly. They have adequate mechanical and dielectric strength. But temperature has an adverse effect on the curing cycle. Their use also requires a change in installation practices. However, this should not be a major difficulty.

Experience so far appears to indicate that present plastic materials have acceptable cost, good insulation, are self-curing, can be applied in a short time, and require a short personnel training period.

Uses . . . The plastic material is being studied for use in other applications.

No experience with these applications is yet available. Some of these applications are:

1. Underground network connection insulation.
2. High-voltage connection insulation.
3. Elimination of the sleeve and wipe on lead or aluminmum covered cable.
4. Repair of existing cables where the junction of the sleeve and lead or aluminum of the cable has opened.
5. Transformer and cable potheads.
6. Repair of leaking joints on pipe.
7. Corrosion prevention of underground and overhead equipment, such as transformers.

Table II—Desirable Resin (Liquid) Characteristics

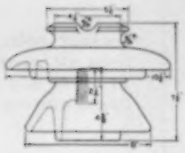
1. Good dielectric properties.
2. Long shelf life.
3. Contains little or no volatile matter.
4. Contains no explosive or toxic material. If toxic materials are used provisions should be made to protect the workman.

Table III—Desirable Chemical Action and Plastic (Solid) Characteristics

1. Exotherm temperatures should not exceed 210F. At this temperature bubbles might appear.
2. On setting, shinkage should not exceed 4%.
3. Gel time should be between 10 and 20 min after mixing.
4. Good bond should exist between cable insulation and plastic.
5. Plastic should have good dielectric properties.
6. Plastic should not be affected by water, salt water, cable, or transformer oil.
7. Plastic should be free from entrapped ionizable gases.
8. Plastic insulation must be capable of withstanding temperatures (perhaps 400F) normally encountered in service conditions.

America's Finest!

VICTOR NO. 245
TRANSMISSION
PINTYPE
(Radio-Freed or Plain)



VICTOR
Purified Porcelain
Transmission Pintypes

VICTOR Transmission Pintypes are America's finest because VICTOR "Know-How" has endowed them with extra long life under even the most severe conditions of service. Made of VICTOR *Purified* Porcelain—they are the finest insulators skilled craftsmen and modern research can produce. Victor Transmission Pintypes are designed with thick, rugged, rounded corrugations for maximum strength and resistance to impact. They have large radius top and side-wire grooves to permit use of new larger conductors, and smooth hard glaze that protects against weathering and contamination. Each is thoroughly inspected at every stage of manufacture. You just can't buy a better insulator!

FEATURES

1. **UNEQUALLED STRENGTH,** thanks to *Purified* Porcelain—finest insulator porcelain ever made!
2. **CUSHION-COATED JOINTS**—special coating at joining surfaces absorbs thermal variations and mechanical shock.
3. **THICK, RUGGED CROSS-SECTION** plus rounded edges give maximum strength, protection against impact, cut replacement costs.
4. **LARGER RADIUS TOP AND SIDE WIRE GROOVES** permit the use of new, larger conductors.
5. **SCIENTIFICALLY COMPOUNDED GLAZE** gives maximum strength and a smooth, self-cleaning surface.
6. **CONTROLLED TESTING AND PROCESSING OF CEMENT** assure highest bond strength at assembly joints.

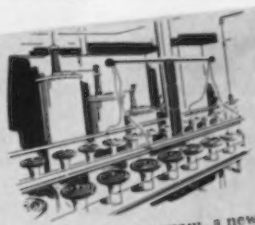
SPECIFICATIONS

60 cycle dry flashover	125 KV
60 cycle wet flashover	80 KV
Positive impulse flashover*	200 KV
Negative impulse flashover*	265 KV
Dry arcing distance	9⅛"
Leakage distance	21"
Pinhole diameter	1⅜"
Rec. pin height	8"
Cantilever strength	3000 lbs.
RNI (plain)	16,000 microvolts
RNI (radio-freed)	200 microvolts
1000 KC at applied	30 KV

*Crest KV. 1½ x 40 microsecond wave Critical Value.

For the full facts on Victor "Know-How," write for "The Story of Victor and Purified Porcelain." For engineering data on Victor insulators, write for Bulletin No. 4.

NEWS FROM VICTOR

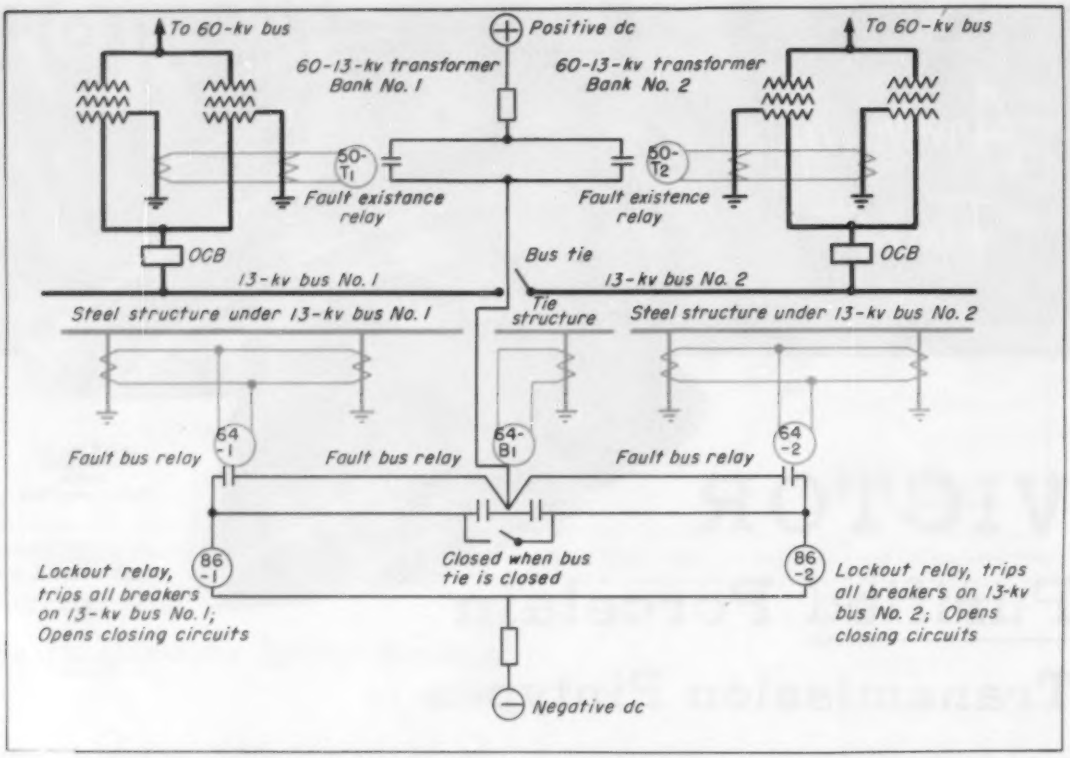


As part of its continuing modernization program, a new 60 cycle, 225 KV continuous flashover tester has been installed in the VICTOR plant. By means of this new equipment, the operator is able to attain more accurately regulated 60 cycle flashover to a definite time standard, thus attaining maximum effectiveness in conducting routine flashover tests.

SPECIFY VICTOR
Purified Porcelain
Pintypes

VICTOR INSULATORS DIVISION
I-T-E CIRCUIT BREAKER CO.
VICTOR, N. Y.

Low and High Voltage Pintypes • Suspensions • Guy Strains
Spools • Switch and Bus Insulators • Custom Designed Porcelain-Insulator Hardware



FAULT BUS RELAYING SCHEME PROVIDES BUS PROTECTION AT DALLAS P&L 60-12-KV STEEL STRUCTURE SUBSTATION

Utility Prefers Fault Bus Relaying

SUBSTATION
Design

Dallas P&L has six 60-13-kv substations where structure and ground cables join to the station ground through fault bus CT's

WILLIAM D. JORDAN, Dallas Power & Light Co, Dallas, Texas

Dallas Power & Light Co has six 60-13-kv substations using overhead steel structure construction with two or more fault bus schemes per station for protection against ground faults. Two 60-13-kv metal-clad type substations have two fault bus schemes respectively, and three now building will have two fault bus schemes per station. At two generating stations ground fault bus schemes protect either 60 or 13-kv buses and breakers.

The "fault bus" in the outdoor overhead steel structure type substation is the supporting steel structure under the switchgear so protected. The structure in a fault bus scheme is bonded together with insulated grounding cable. Structure and ground cables are connected to the station ground through the fault bus current transformer. Through this one path from the steel structure to station ground most fault current flows, although a small part also flows through stray ground paths to the concrete foundations. Yet current is sufficient through the current transformer for correct relay operation.

The current transformer's secondary is connected to an instantaneous plunger type relay, the contacts of which are in series with those of the fault existence relay for operating a lockout type relay. The last trips all breakers connected to the protected bus.

How Fault Existence Relay Operates . . . The fault existence relay for a 13-kv fault bus scheme is an instantaneous plunger overcurrent type connected to the secondary of a current transformer in the 13-kv grounded neutral of the power transformer bank. This relay determines there is an actual fault before allowing the lockout relay to operate. It also operates on close-in feeder faults which do not activate the fault bus relay; this keeps the lockout relay from operating on external faults.

The fault existence relay for a 60-kv fault bus scheme is an instantaneous voltage relay connected to complete the delta of a wye-broken-delta transformer. This transformer's wye connects to the secondary of the 60-kv bus potential transformers. This fault existence voltage relay is set to operate on any ground fault at or near the station bus.

Precautions and Tests . . . In a station where there is a chance that stray ground currents may flow in the fault bus current transformer, two current transformers have their secondaries

(*Continued on page* 27)

G&W TYPE
"St-Sodertite" Potheads
SOLDERED PORCELAIN

Moisture, Oil and Gas Tight Factory Sealed Joints Without Gaskets

These potheads are factory assembled, with metal-to-porcelain soldered joints. This method completely eliminates the possibility of future trouble due to loosely gasketed joints. When these potheads are used, the responsibility for properly sealed joints rests with our factory. Troubles due to aging, cold flow and permanent set of gasket materials are eliminated.

Since introduced in 1940, G&W "Sodertite" potheads have achieved an enviable service record and have been adopted by many utilities.

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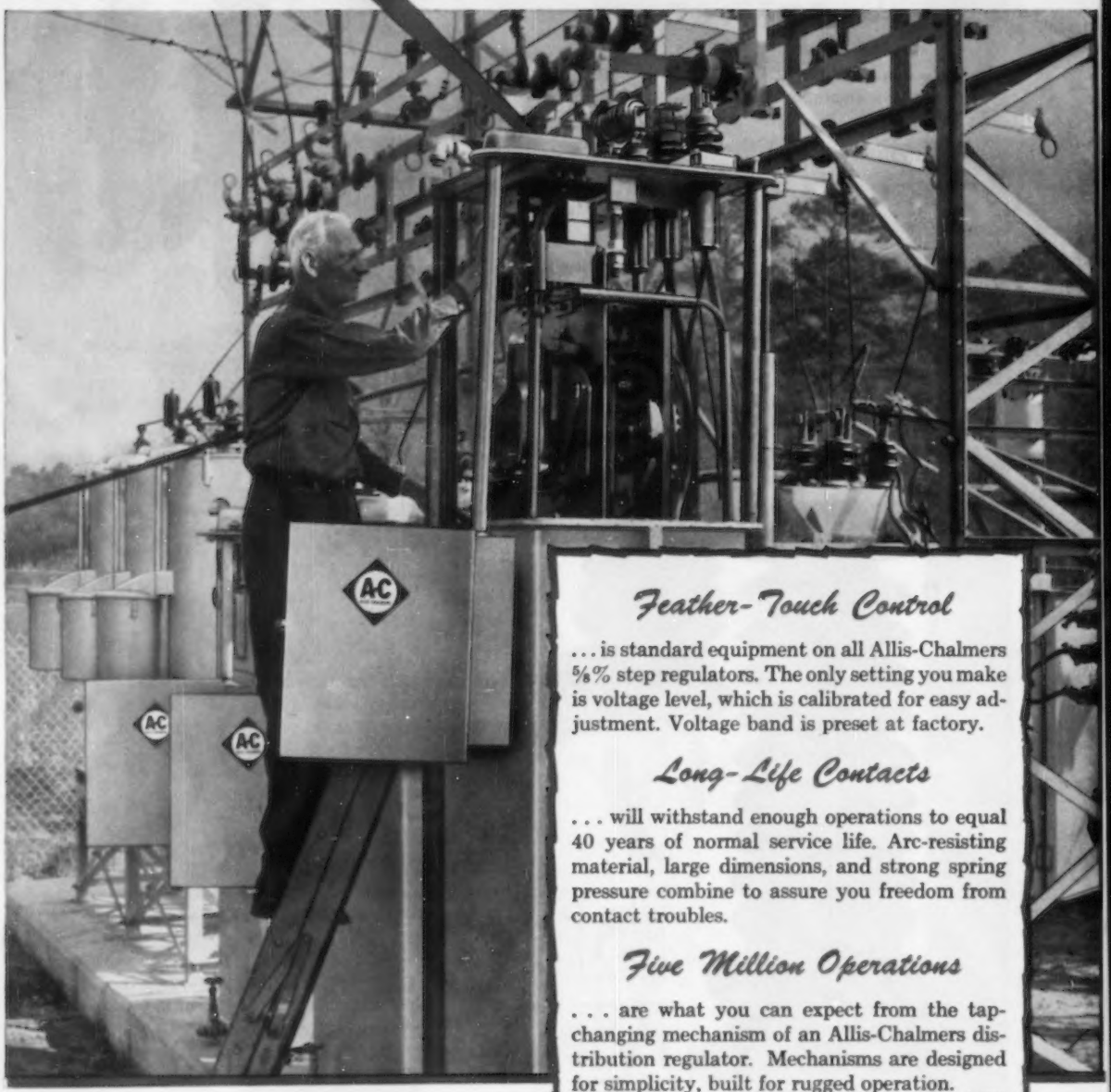
1955

G&W

A543A

How Cover Regulator



Feather-Touch Control

. . . is standard equipment on all Allis-Chalmers 5/8% step regulators. The only setting you make is voltage level, which is calibrated for easy adjustment. Voltage band is preset at factory.

Long-Life Contacts

. . . will withstand enough operations to equal 40 years of normal service life. Arc-resisting material, large dimensions, and strong spring pressure combine to assure you freedom from contact troubles.

Five Million Operations

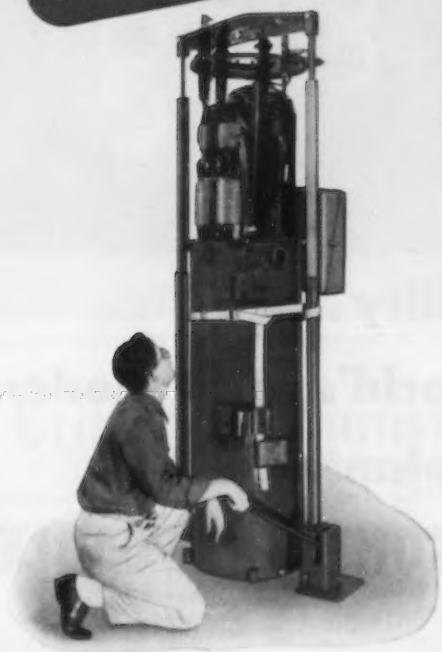
. . . are what you can expect from the tap-changing mechanism of an Allis-Chalmers distribution regulator. Mechanisms are designed for simplicity, built for rugged operation.

A-4770

ALLIS-

Suspension Saves Inspection Time

ALLIS-CHALMERS
5/8% STEP VOLTAGE REGULATORS



Untanking a regulator is easy when its components are cover suspended. Use a truck crane, block and tackle, or this more convenient inspection jack. Designed for use with Allis-Chalmers regulators, it can be used to untank either distribution or single-phase power regulators. Jacks are available—see your nearby Allis-Chalmers office.

ROUTINE inspections are *really* routine when you have Allis-Chalmers single-phase voltage regulators on your system. It takes less time and less manpower to inspect an Allis-Chalmers single-phase regulator than any other regulator on the market.

Here's why! A-C regulators have all their components suspended from the cover when untanking. Just remove a few cover bolts and control cabinet mounting bolts. Then hoist up on the cover and the complete unit — tap changer, transformer and control — comes up into view. There are no leads to break; no oil to mess with.

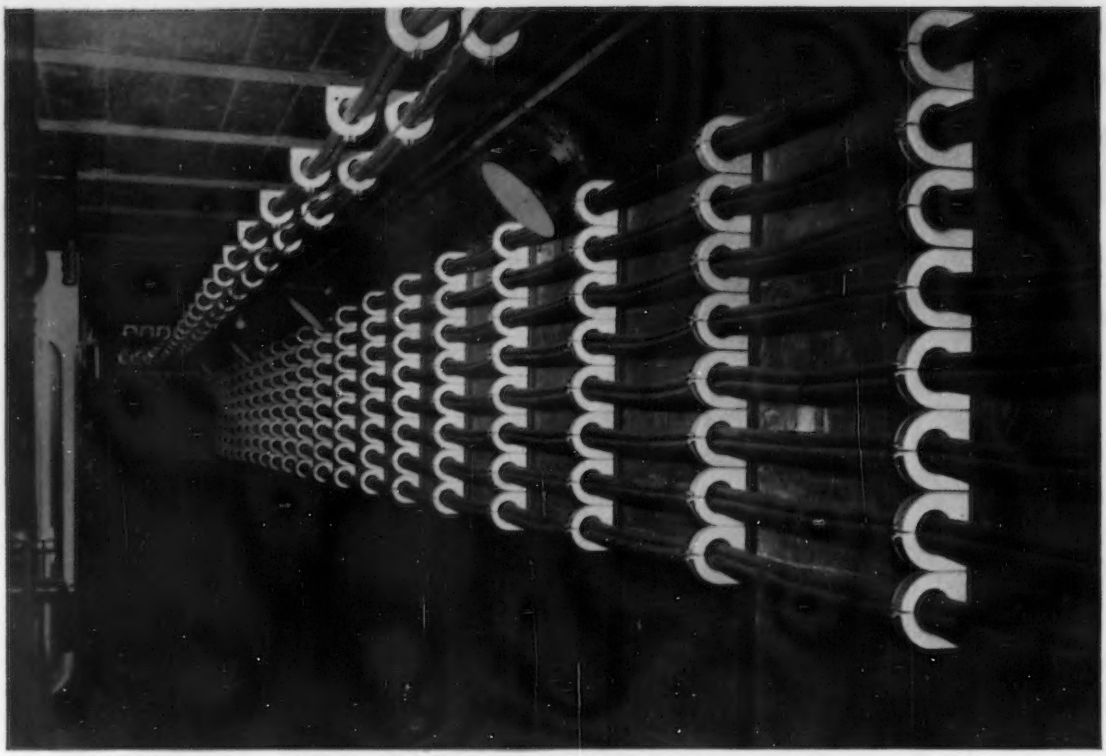
You can operate the complete unit outside the tank. Just connect an external power source to energize the control. There are no special connections to make.

Conveniences like these come as the natural result of Allis-Chalmers experience in the design and manufacture of step regulators. No other manufacturer can match it. And no other manufacturer offers 5/8% step regulators that have given more than 20 solid years of utility satisfaction.

Get complete information. Call your nearby A-C district office or write Allis-Chalmers, Milwaukee 1, Wisconsin.

CHALMERS

A-C ALLIS-CHALMERS



for maximum dependability . . .

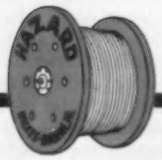
Nothing was spared to provide the surest and most adequate supply of electrical energy for the huge motors, pumps and other equipment that make the Scranton Ordnance Plant, operated by the United States Hoffman Machinery Corporation, the largest and most modern of its type in the world.

In production less than 18 months after the project was approved, the plant makes extensive use of Keystone-Hazaprene 5kv non-shielded cable.

A typical application of this top-quality, yet economical cable is found in the plant's forge shop. There, 1/conductor 750,000 mcm Keystone-Hazaprene 5kv non-shielded cables feed power from 3 - 5000 kva transformers to 12 - 600 hp and 12 - 450 hp pumps which provide hydraulic pressure for the main drawing and forging operations. These dependable power feeder cables are installed in interconnecting underfloor tunnels like the one shown above.

You, too, can use Keystone cables to advantage in your operation. Ask for Bulletin H-463 for full details or write Hazard Insulated Wire Works, Division of The Okonite Company, Passaic, N. J.

world's most modern shell plant specifies KEYSTONE 5KV CABLES



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BRIGHTON'S MAYOR EXTENDS CITY'S WELCOME TO 2,000 DELEGATES ATTENDING ELECTRICAL POWER CONCLAVE

Britain Optimistic on Atom Power

GENERATION
Planning

Power Convention breathes confidence in next decade's nuclear plant progress, but anxious over coal and oil in 'gap' period

J. H. M. Sykes, Bedford, England

Confidence in the ultimate ability of utilities to use the atom for supplying Britain's additional power needs pervaded the recent five-day British Electrical Power Convention at Brighton. This optimism, however, was somewhat overcast by anxiety over the sufficiency of coal and oil for supplying needs in the next decade.

The convention brought together electrical engineers from such various fields as the utilities, manufacturing, consulting, education, trade unions, and governmental departments.

Confidence in the future arose from Britain's world lead in nuclear power generation. The nuclear power program, costing more than $900 million, is expected to provide about 2,000 Mw of plant to meet the 1965 demand on the Central Electricity Authority estimated at 36,000 Mw. These figures were given by a deputy chairman of the authority. The program will start within a year with the commissioning of an 80-Mw-capacity plant at Calder Hall.

Calder Hall Details . . . The Calder Hall plant will use Uranium 235 to liberate heat and provide Plutonium 239. The heat will be carried by carbondioxide into four heat exchangers powering a conventional steam power station.

In 1957, construction will start on two stations, probably of the Calder Hall type. Each 160-Mw station will have two gas-cooled, graphite-moderated reactors of 80-Mw capacity, and the steam paths will probably include high and low-pressure sections, with superheat, to achieve higher steam efficiencies.

The next batch of reactors, on which construction is scheduled to begin in 1958, will be of the gas-cooled type also, but are expected to have a greatly improved performance in regard to heat rating. Four more stations are expected to be under construction in 1960, when sufficient fissile material will probably be available for designing liquid-cooled reactors using normal water, heavy water, or other liquid, at considerably lower capital costs.

(*Continued on page* 27)

NEW!
HOLDS 4200 POUNDS ON 4/0 ACSR*

The Burndy dead-end clamp type CUW-A-E is made of high strength aluminum alloy with excellent weathering properties. Pulling eye is in line with the center of the cable to permit a straight pull. Single saddle under captured U-bolts distributes pressure over a long contact surface. Belled cable entrance prevents damage to cable strands. The cable may be cut off and dead-ended in the connector or carried through for jumper application.
Furnished with galvanized steel U-bolts and clevis pin.
Write for detailed data sheet.

*BURNDY Dead-End Clamp, Type CUW-A-E

ALUMINUM		ACSR	
SIZE	HOLDING STRENGTH IN LBS.	SIZE	HOLDING STRENGTH IN LBS.
4/0	3,400	4/0 (6-1)	4,200
350 Mcm	5,000	336.4 Mcm (18-1)	5,500
500 Mcm	7,600	477 Mcm (18-1)	7,700
1000 Mcm	10,000	—	—

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British Consider Power Outlook

(*Continued from page* 25)

The possibility of using conventional fuel to superheat nuclear-generated steam is being examined.

Envy of American material resources appeared in convention statements that the U. S. wartime stockpiling of fissile material on a huge scale would give American engineers great advantages when major power plants came under construction. In Britain, huge chemical plants have had to set up for processing raw uranium ores.

The convention voiced confidence in the ability of British manufacturers and operating staffs to carry through the nuclear power production plan which envisions 13 nuclear stations within the next decade. There was some doubt about the solution of fuel problems in the "gap" period, possibly 20 years, before nuclear power could take over on a worthwhile scale.

Coal Output Falling . . . The falling output of the British mining industry has presented the government with a tantalizing problem. The government must solve the problem of a capital allotment for super-mechanization to increase an industry's output when the asset is a wasting one. Within 30 years, the industry's main customer, the electric utilities, may no longer require its product.

Nevertheless, coal problems require some solution, and increased mechanization, involving much equipment imported from the U. S., is on the way. Steam power plants being constructed or designed are of much larger sizes and contain units of up to 200 Mw. These have been criticized as departures from the established policy of installing many small units rather than fewer large ones.

These 200-Mw units will have steam pressures at the turbine stop valve of 2,350 psig, the temperature being 1,050F, with reheat temperature of 1,000F. The expected test efficiency is 36.6%.

A-Plant Load Factors . . . Nuclear plants, J. Eccles, CEA deputy chairman (operations), pointed out, will have to run at very high load factors, probably 70 to 80%. Such load factors will mean that steam stations associated with the nuclear plants will have to run at correspondingly lower load factors. Thus, British utilites will be compelled to consider one or two-shift working schedules.

Eccles questioned the efficacy of research, now in progress, into the use of supercritical steam pressures. The very large units required to make supercritical pressures worthwhile, he said, might not be capable of constant starting up and shutting down necessarily associated with power-producing units in a system half nuclear, half steam.

With its present demand of 20,173 Mw, the Electricity Authority is the biggest coal user, dipping into the diminishing British fuel pool to the extent of more than 37 million tons a year. For the year ended March 31, 1955, Britain was compelled to import, mainly from the U. S., 2.2 million tons of coal for electrical generation, and a large contract for imported oil fuel was placed recently.

To retain her place in world markets, Britain's most pressing need is for more electrical power to provide industry with the means for greater productivity. This need was sounded repeatedly at the convention. Indices of mining and manufacturing productivity for Great Britain and the U. S., in terms of output per man-year, showed that at last the British rate of increase of productivity is slightly higher. But this rate of increase starts at a much lower level.

Convention speakers also expressed concern over the shortage of young men entering scientific training, both in the works of manufacturers of complex plant for nuclear power stations and in the utilities constructing conventional power plants. The highly urbanized countryside and the scarcity of large rivers for coal supply and cooling water, it was pointed out, has increased the difficulty of siting new power plants, nuclear and conventional. Agencies searching for sites, it was reported, have taken as long as three years in their quests for suitable locations.

How Loads Are Forecast . . . The accuracy of available loading forecasts, Eccles declared, is essential to planning generating plants and determining areas where increased load is to be expected. Area electricity boards, independent distributing organizations buying CEA power and selling it under monopoly charter to consumers in their areas, estimate probable requirements, based on local knowledge, at each point of supply from the CEA. The CEA staff makes independent estimates along market research lines, taking into account national economic and social factors.

The CEA national operation staff, controlling load flows over the whole national network, coordinates the average values obtained from the other sources. Although load estimates produced in recent years by the CEA and the U. S. Federal Power Commission have been reasonably satisfactory, British forecasts worked out considerably closer to the actual loads, Eccles said.

He and others pointed out, however, that American utility men, having three-year construction periods for major power plants, can be more casual about the far distant electrical horizon than Britons. In the United Kingdom, five to seven-year periods are the rule. This longer construction period is due to the complexity of planning a power plant site before civil, electrical, and mechanical design can be worked out.

Prefers Fault Bus Relaying

(*Continued from page* 20)

paralleled in such a way as to cancel out any circulating currents.

Before placing a fault bus scheme in service, ground resistances are measured and leakage currents determined to establish that there is only one metallic path to station ground from the ground leads and switchgear structure.

To check operation, primary phase-to-ground faults were staged on the three 13-kv fault bus schemes in a typical substation. Relay action was checked and fault and circulating currents measured with photographic type oscillographs. Successful completion of these primary fault tests provided assurance that the scheme would perform correctly under actual operating conditions. The tests also proved that insulated ground lead, current transformer, and relay connections were in good condition.

Results of these staged-fault tests were helpful in selecting accurate relay settings and in checking fault current calculations and the operation of oil circuit breakers under controlled fault conditions.

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1954: USE OF FORMEX WIRE
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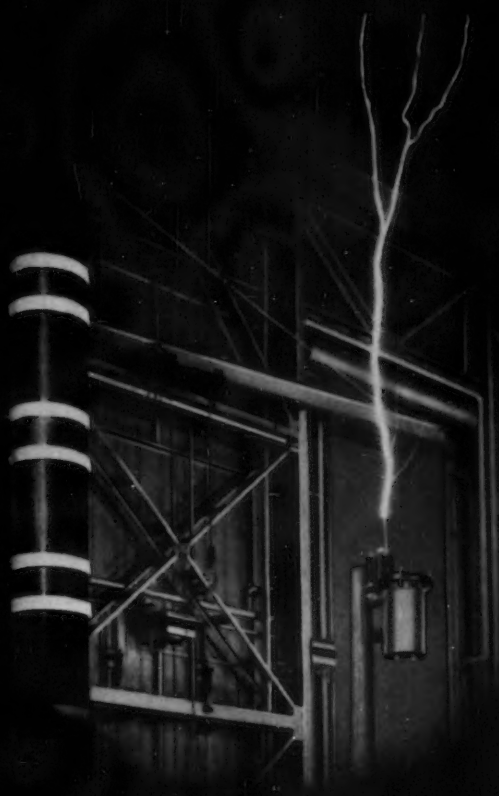

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1937: GRAIN-ORIENTED CORE STEEL
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Four research landmarks that mean

MORE TRANSFORMER FOR YOUR DOLLAR

Research is a cold word until it is translated into what it does for you. Today's distribution transformers show how research gives you a better product for less money. Four high-spots are:

1954: Formex† wire cuts weight and size 5 to 10%. Constant research perfected a method of applying enamel insulation to rectangular transformer wire, thus extending the advantages this type insulation had already provided to G-E motors.

1953: Super Melaglyp increases paint life 50%—and this is only an average. In corrosive atmospheres, Super Melaglyp lasts up to 150% longer than the best previous finish.

1950: High Voltage Laboratory built for more effective research with tools such as the world's largest impulse generators (15,000,000 volts). Magne-valve lightning arresters are just one example of the value of this research.

1937: Grain-oriented core steel reduced price, weight, size. First utilized in the ingenious Spirakore† transformer design, this development alone has saved the electrical industry over $100,000,000. 431-25

†Reg. trade-mark of the General Electric Company.

*ATANA. It's easy to see that *All Transformers Are Not Alike* and G-E research will keep working to give you more transformer for your dollar. General Electric Company, Schenectady 5, New York.

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take your choice
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Progress Is Our Most Important Product

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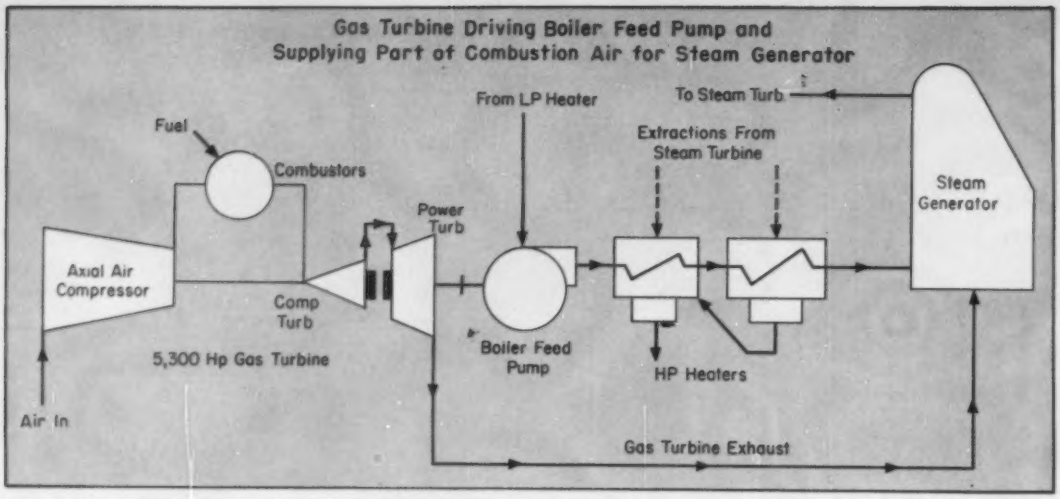


GAS TURBINE CAN DRIVE BOILER FEED PUMPS AND ALSO SUPPLY COMBUSTION AIR FOR THE STEAM GENERATOR

Gas Turbine Best for Feed Pump Drive

GENERATION
Design

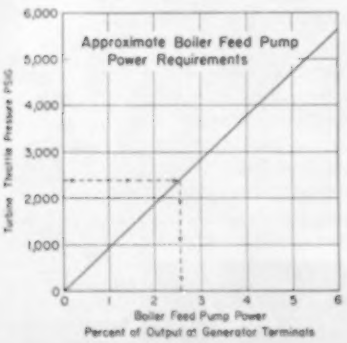
Plant output increases as gas turbines provide an independent, direct-coupled boiler feed pump drive having flexible speed

C. J. BURKE, Westinghouse Electric Corp, Philadelphia, Pa.

Gas turbines should be considered for boiler feed pump drives in large steam power plants because:

1. Gas turbines provide an independent, self-contained, quick-starting prime mover.

2. Gas turbines provide the operating speed flexibility required for most efficient and economical part-load operation.



FEED PUMPS in new high and supercritical pressure steam plants will require 2 to 6% of plant's power output

3. Gas turbine and boiler feed pump speeds can be matched permitting direct connected units. This eliminates hydraulic coupling and step-up gears.

4. Gas turbines relieve the steam generator and turbine generator of boiler feed pump load. This increases plant output.

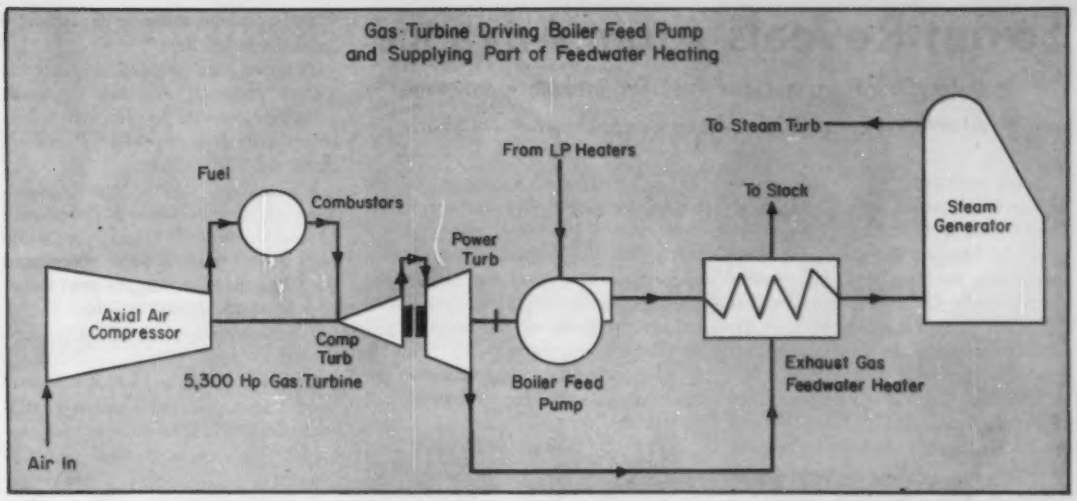
5. Gas turbine exhaust can be used in the steam cycle, either for feedwater heating or as part of the combustion air requirements of the steam generator.

Power Requirements . . . The accompanying graph shows the approximate boiler feed pump power requirements with varying turbine throttle pressures. It indicates that a 2,400-psi unit will use approximately 2.6% of the plant output at the generator terminals as boiler feed pump power. This would mean 5,200 hp for a 150,000-kw plant. A 5,300-hp gas turbine could supply this load.

Such a turbine consists of an eleven-stage axial air compressor, six combustors, two-stage compressor turbine, and a single-stage power turbine. Air is compressed to about 58 psia in the axial compressor. The compressed air then flows to the six combustors where fuel is admitted and burned to heat the air to about 1,350 F. The hot gases expand through the compressor turbine which converts the heat energy into mechanical energy to drive the axial air compressor. Further expansion of the hot gases through the power turbine drives the load, in this case a boiler-feed pump. After leaving the power turbine, the exhaust gases can be used in the steam cycle.

Both the compressor and power turbines are enclosed in a single casing. The compressor turbine discharges into the power turbine. Two mechanically separate in-line shafts are provided permitting the speed of the power turbine to be independent of the speed of the compressor turbine. The power-turbine speed can therefore be varied over a wide range to meet fluctuations in boiler feed pump load requirements during part-load operation of the steam plant.

Supercritical Pressure Units . . . The increases in boiler feed pump power, with increasing steam pressures, infringes upon the potential thermal cycle gain and beyond the optimum pressure. This causes a net overall cycle loss. The amount of boiler feed pump power required on a supercrit-



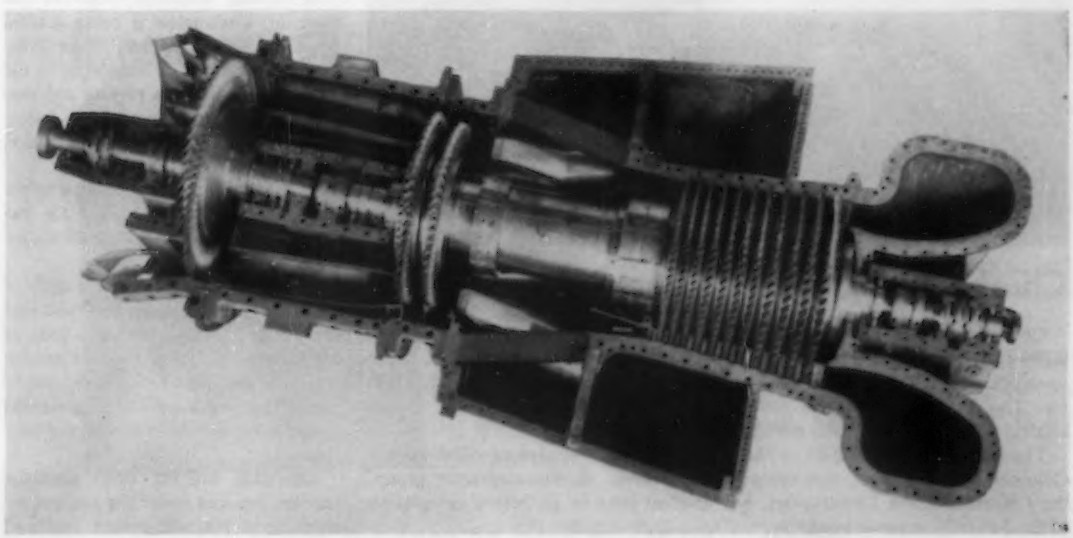
HEATING FEEDWATER IS WAY TO IMPROVE HEAT CYCLE OF A PLANT USING GAS TURBINE DRIVEN BOILER FEED PUMPS

ical pressure plant will be quite large. For instance a 250,000-kw plant operating at 4,400 psig will require 19,400 hp, 5.8% of plant output. Boiler feed pump power of this magnitude make it desirable to investigate fully the advantages offered by the integration of the steam and gas-turbine cycle.

Use in Steam Cycle . . . In addition to driving boiler feed pumps the gas turbine can supply exhaust gases for further use in the steam cycle.

The exhaust can be used to supply part of the feedwater heating for the steam cycle. With a heater stack temperature of 350 F, approximately 48 million Btu per hr can be obtained from the gas-turbine exhaust. Use of a gas turbine in this manner will increase net plant capacity and decrease overall plant heat rate. The most economical heater arrangement can be determined by analysis and evaluation of all of the factors involved for each specific application.

Another application is to use the exhaust gases in the steam generator. As large amounts of excess air are used in the gas turbine, to limit the maximum temperature to 1,350 F, the exhaust contains 18% oxygen, compared with 21% for free air. With this high oxygen content, the exhaust can be used as part of the preheated combustion air for the steam generator. The exhaust flow from a 5,300-hp gas turbine will supply from 25 to 30% of the total combustion air requirements for a 150,000-kw steam generator.



5,300-HP GAS TURBINE can supply feed pump power for 2,400-psi, 150,000-kw unit. Eleven-stage air compressor at right is driven by two-stage turbine in center of shaft. Feed pump power is supplied by single-stage turbine at the left

Soviet Reveals Atom Advance

- **Bulganin offers nuclear fuel for international pool**
- **Atomic power plant has been in operation for a year**

Some indications of Russia's strides in her development of the atom have been revealed recently.

Soviet Premier Marshal N. A. Bulganin, at the top-level, four-power conference in Geneva, announced that the Soviet Union would contribute fissionable material to an international pool for the use of other nations.

The offer implied that the cautious Soviet had nuclear fuel in sufficient quantities to give some away without missing it. However, there were strings attached. Bulganin added that Russia would not contribute until an international atomic energy agency, as proposed by Eisenhower, had been established.

This gesture of co-operation followed, by a few days, the announcement that a 5,000-kw atomic power plant had been operating in Russia for a year. News of the installation was disclosed at the Soviet conference on peaceful uses of the atom staged at the Soviet Academy of Sciences in Moscow. Indian delegates to the international gathering were permitted to tour the plant.

Dr. V. S. Fursov, Soviet physicist, reported that his country has built a series of reactors, ranging from simple uranium-graphite units to more complex installations. He stated that "the reactor of the atomic electric station is a uranium-graphite system which employs water under pressure as a carrier of heat."

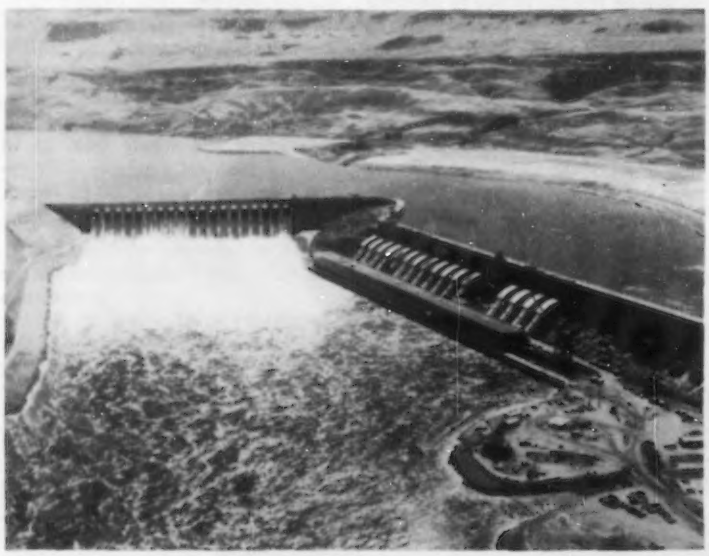
However, he implied, the atomic station produces relatively high-cost electricity. Atomic power cheaper than steam power is the aim of present research, Fursov said.

Visitors from India, Israel, Japan, Yugoslavia, Albania, Communist China, North Korea, and other countries were present with prominent Soviet scientists at Moscow's prologue to the United Nations' atoms-for-peace conference set for Geneva, Switzerland, August 8-20.

Those in the United States who were invited to attend the Russian conference declined because they felt the Soviet was seeking to steal Geneva's thunder.

In his opening address to the Moscow gathering, A. N. Nesmeyanov, head of the Soviet Academy, recalled that the Soviet had offered technical assistance in the development of atomic programs to eight satellites. He then expressed his confidence that the atomic conference in Geneva would offer a similar opportunity to other countries.

It is reported that Soviet scientists, urged on by their government, have prepared some 100 papers for presentation at Geneva.



Chief Joseph Intake Structure Complete

Chief Joseph Dam's intake structure was recently completed to its full 2,034-ft length, and generating units have been installed in 16 of its 27 penstock openings. Ultimate expansion to 27 units will provide a total rating of 1,728,000 kw. The first three 64,000-kw generators are slated to go on line Sept. 1 with another following every three months.

The $27-million dam, part of the Army Corps of Engineers' $169-million Columbia River Project, was completed in March. A nine-contractor group, the Columbia River Constructors, has another year to go before completion of the $40-million powerhouse.

The 230-ft high, 4,224-ft long dam, down stream from Grand Coulee, creates a reservoir, Rufus Woods Lake, with 480,000 acre ft of water storage.

Washington State Plans Revised Electrical Code

A revised electrical code for the State of Washington is being drafted by a special committee. John Albi, Seattle City Light, is chairman of the group which includes private and municipal power companies, Public Utility Districts, Rural Electrification Associations, and labor unions.

The committee was appointed by Ed Sorger, supervisor of safety for the State Department of Labor & Industries.

Albi calls the existing state code of 25 pages "wholly inadequate" and says the group is using a national code of approximately 300 pages as a model. They are revising to meet local conditions. The new code will be presented to the 1957 State Legislature for consideration.

The code will not affect domestic services, covered under city and county regulations, but will govern overhead and underground supply and distribution systems.

M. L. Bright, Distribution Transformer Specialist, demonstrates this

FACT: Completely interlocked LV bushing preserves seal and internal clearances

All Westinghouse pole-type distribution transformers feature threaded porcelain low-voltage bushings that are secured internally by spring grip nuts to provide the best possible seal. They are also fully interlocked to prevent breaking the seal or any accidental change in internal clearances. *Connectors are suitable for copper or aluminum conductors.*

It's another of the many design advances in the complete new Westinghouse line that spell more for your transformer dollar.

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TYPE 44 INSTRUMENT CHART
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Designing instruments to help management make sound decisions

Electric utility managements continually face the urgent question, "How do we improve present system efficiencies and intelligently plan for future capacities?"

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Westinghouse has long anticipated that today's swiftly paced expansion in power systems would accentuate the need for accurate recorded information, a basic foundation in making sound management decisions. Needs of the industry were surveyed, and one timely answer to the kind of instruments desired now appears in the new Westinghouse line of strip chart recorders—the Type 44.

Operational efficiencies and economies are studied by means of the recording voltmeters. Recording varmeters show where the power is being wasted and corrective measures are needed. Recording wattmeters and ammeters give you the information necessary to plan for load growth, proper distribution, and the addition of generating equipment and distribution facilities.

All of these new recording instruments can help you cut costs, develop more reliable operation, make better planning decisions for the future. Indirectly, they will also help you maintain stability and continuity of service, thereby protecting customer good will.

The Type 44 recorder is another example of Westinghouse contributions to electric equipment pioneering. Westinghouse makes a full line of electric measuring instruments for every electric utility requirement—will gladly help you apply them to your instrumentation systems.

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YOU CAN BE SURE...IF IT'S

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New, iron-core measuring mechanisms develop twice the torque of previous designs . . . provide faster response, accuracy within 1% under all operating and load conditions.

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All parts are fully accessible from front of recorder, a particular advantage in flush switchboard mounting.

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Used to make operation and load studies in electric power generating stations, substations, field surveys, and in field service. Also used in industrial applications to check machine performance and factory distribution systems.

Less Mounting Space

Recorder has highest ratio of scale width to panel area, is attractive in appearance and easy to read.

Economy

Less maintenance, long charts last 70 days . . . large ink capacity permits operation for greater unattended periods.

Dependability

Extremely high overload capacity reduces possibility of burnouts. All mechanisms self-shielded against stray magnetic fields.

For more information on Type 44 recorders, call your Westinghouse representative or write direct to Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania.

Pacific G&E Names Sibley and Gros VPs

S. L. SIBLEY

R. R. GROS

Shermer L. Sibley and Robert R. Gros have been named vice presidents of Pacific Gas & Electric Co.

Sibley, an engineer and assistant to the president, has been appointed assistant general manager. Gros, manager of advertising and publicity, has been assigned responsibility for informational activities and special projects for the utility's president.

Sibley joined PG&E after graduation as an electrical engineer from University of California. He has been an industrial power engineer, assistant to the vice president, and, since 1954, assistant to the president.

A 1935 Stanford University graduate, Gros was employed by PG&E in 1937. He became manager of advertising and publicity in 1944 at the age of 29.

Coe Becomes VP of New England Power

Roger J. Coe, head of New England Electric System's atomic studies and activities, has been made a vice president of New England Power Co, a NEES subsidiary.

Coe is a 1925 electrical engineering graduate of Cornell University. After one year with General Electric Co, he joined New England Power as a technical assistant. He has served as assistant electrical engineer, assistant to the chief engineer, and, since 1945, assistant chief engineer.

Coe worked with the National Defense Research Committee Transition Office 1943-45. He was loaned to the government again in 1950 to become executive director of the Committee on Ordnance, Research and Development Board, Department of Defense.

R. J. COE

J. K. DAVIS

Toledo Edison Shifts Duties

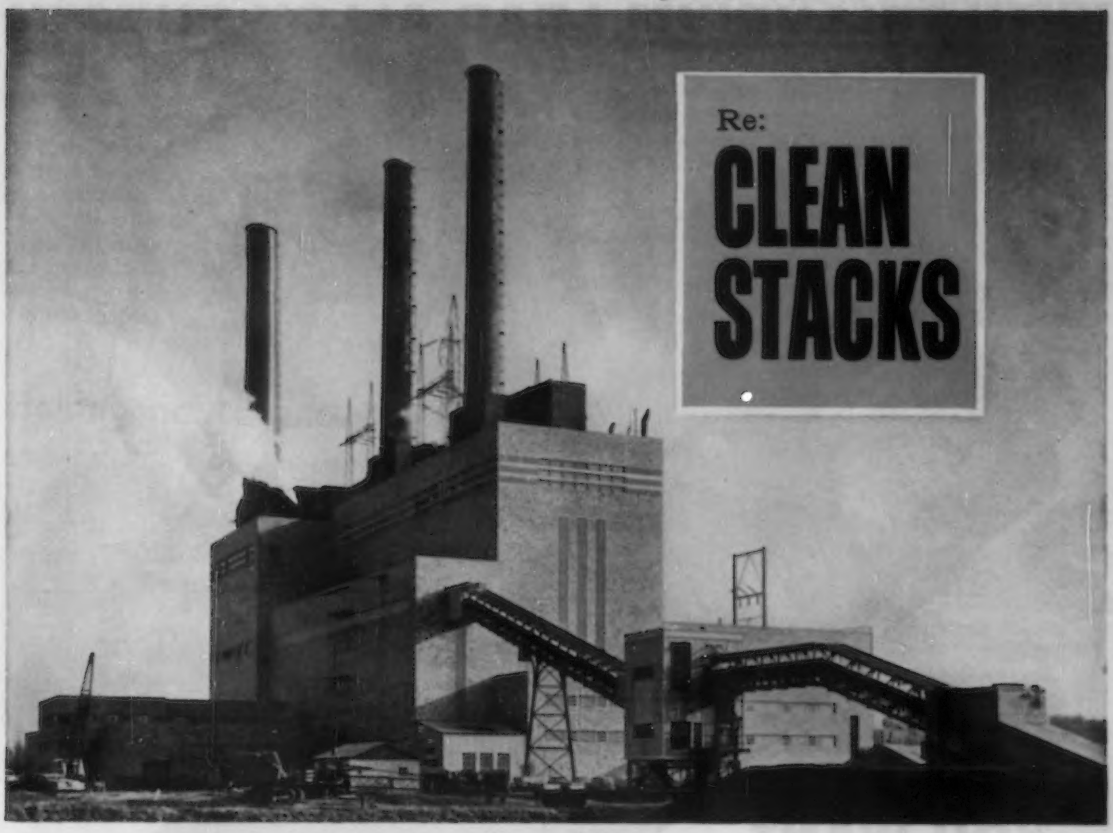
Toledo Edison Co has appointed Vice Presidents John K. Davis and P. R. Knapp to assume the executive duties of Charles A. Harrison, vice president and director who died recently (EW, July 4, p 39).

Davis has been named head of the sales department in addition to his regular duties. Knapp has been elected a director to succeed Harrison.

Davis joined Edison in 1946, was named vice president and a director in 1949, and became assistant general manager in 1955. After 36 years with the utility, Knapp became operations-engineering vice president in 1953.

P. R. KNAPP

Research for New Savings in Power Plant Operations



HOW MANY MILLS PER KILOWATT-HOUR?

Public utility men, always anxious to eliminate air pollution and improve community relations, have spent many millions of dollars to hold fly-ash emission and other stack discharges within permissible limits. Being equally conscious of the need to hold the line on cost of power plant construction and operation, they are naturally seeking ways to cut the costs of obtaining clean stacks.

B&W's concern with clean stacks is reflected in its own research and in gains already made in both coal- and oil-firing. A major contribution was the slag-tap furnace which permitted recovery of much of the ash in the furnace as slag. A more recent development, the Cyclone Furnace, allows only about 10 per cent of the ash to enter the gas stream. Used with simplified precipitators, it reduces fly-ash discharge to exceedingly small amounts. Improved oil burners also mean clean stacks. In addition, research on the application of additives to the fuel oil indicates marked reduction in formation of sulfur trioxide with corresponding reduction in discharge of corrosive acids and ash particles.

Many questions remain to be answered, and time and money must be spent to find economical solutions that will stand up in service. In B&W's completely equipped Research Center at Alliance, Ohio, complete pilot units are built and operated under field conditions in a full-scale effort to extend the knowledge of combustion methods, stack discharge, and steam generation. Developments such as the Cyclone Furnace, improved pulverized-coal firing, the Cyclone Steam Separator, materials for higher pressures and temperatures, and the Universal Pressure Steam Generator are some of the better known results of this unique program. The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.

ROEBLING PAPER POWER CABLE WITH TELLURIUM LEAD ALLOY SHEATH

YOU WANT

- *EXTRA FATIGUE RESISTANCE,*

PLUS

- *LOWEST LONG-TIME CREEP RATE,.*
- *HIGH BURSTING STRENGTH,*
- *TOP STABILITY UNDER HEAT,*
- *ABOLITION OF FREQUENT STOP JOINTS OR REINFORCED LEAD SHEATH,*
- *ABOLITION OF NEED FOR GENEROUS EXPANSION BENDS OR LARGE MANHOLES...*
- *THE DEPENDABILITY ASSURED BY OUR EXCLUSIVE MANUFACTURING, TESTING AND FIELD EXPERIENCE...*

IN SHORT,

YOU WANT

ROEBLING

Subsidiary of The Colorado Fuel and Iron Corporation

JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13235 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 331 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.

Key I-T-E Post to Buck

Harry L. Buck, treasurer of I-T-E Circuit Breaker Co since 1946, has been elected vice president and general manager. He will be responsible for the electrical manufacturing divisions of the company.

A graduate electrical engineer, Buck joined I-T-E in 1935. He became assistant to the president in 1944 and headed the Special Products Division the next year.

H. L. BUCK

3E Elects Koerner VP

Electrical Engineers' Equipment Co has elected Charles A. Koerner vice president. He will continue to serve as chief engineer in addition to his new responsibilities.

Koerner has been a private consultant to military contracting plants and to civilian plants on production problems. He joined 3E as assistant chief engineer in 1951 and became chief engineer in 1954.

C. A. KOERNER

Holophane Advances Rae

G. G. RAE

Holophane Co, Inc, has promoted Gene G. Rae to vice president, Controlens Division.

Since 1937 Rae has been with Holophane as field representative in Washington, D. C., and, later, manager of the Controlens Division.

He is a 1937 graduate of Brooklyn Polytechnic Institute and has been an instructor in lighting and a thesis adviser there for the past ten years.

Peter Made EC&M VP

W. H. PETER, JR

Wilbur H. Peter, Jr, has been elected a vice president of Electric Controller & Manufacturing Co. He continues as works manager.

A business administration graduate, Peter joined Electric Controller in 1937. He has served as field engineer, manager of production control and personnel, production manager and shop superintendent, and, since 1954, works manager.

PERSONAL BRIEFS

A. James McCollum has been named manager of Pacific Gas & Electric Co's department of advertising and publicity. McCollum, the utility's news bureau chief since 1946, succeeds Robert R. Gros, newly elected vice president (see page 36).

American Society for Testing Materials has elected **Claire H. Fellows** to a one-year term as president. He is director of Detroit Edison Co's engineering laboratory and research department . . . **Henry H. Kerr,** vice president and executive engineer of Toledo Edison Co, is the new president of Engineering Society of Toledo.

Florida Power Corp has promoted **Ralph W. Norman** to assistant division manager in addition to his duties as division engineer, Northern Division. **James L. Shoemaker** has joined the Florida utility as sales development analyst of the commercial departments. Previously he was project supervisor of the Marketing Services Division of Dun & Bradstreet, Inc, New York City.

Union Electric Co of Missouri has named **Barrett M. Carothers** chief planning engineer and head of the new Planning Division. He was an electrical engineer in the engineering and construction department until his present assignment.

Connecticut Valley Power Exchange, joint planning group for Connecticut Power Co, Hartford Electric Light Co, and Western Massachusetts Electric Co, has appointed **Robert N. Youtz** chief system operator with responsibility for the Exchange's operating functions. He had been system chief operator of Pennsylvania Water & Power Co.

The United States Rubber Co's Naugatuck Chemical Division has announced the following organizational changes: **Earle S. Ebers,** director of research and development, has been named general sales manager; **D. Lorin Schoene** has been promoted from assistant director to director of research and development; and **F. Dudley Chittenden,** factory manager at the Painesville, Ohio, plant, has become division production manager.

OBITUARY

Andrew J. Duncan, 77, former president of Texas Electric Service Co, died last month at Fort Worth, Tex.

J. Scott Milne, 56, president of International Brotherhood of Electrical Workers, died at Portland, Ore., July 20.

Carl H. Mueller, 60, vice president of Rumsey Electric Co, died recently at Philadelphia, Pa. He was in charge of sales and field engineering for Delta-Star Electric high tension switching equipment and Lapp Insulators.

Leads of 48-inch 600-volt #12 wire furnished as standard equipment.

Bushing-Mounted Indicating Fuse with 48-inch lead can be supplied.

Solder-Sealed Bushings of strong one-piece wet-process porcelain provide a positive, lasting seal.

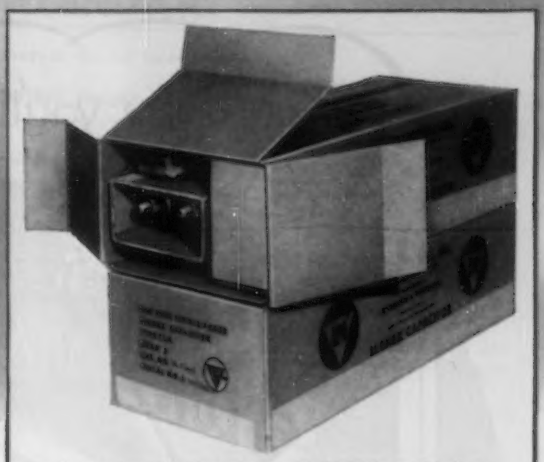
Pole-Mounting Bracket has two 9/16" holes for ½" lag screws. Standard EEI-NEMA crossarm-mounting bracket furnished if required. Capacitor can be mounted with bushings up or down.

Aluminum Metallizing process protects steel tank from oxidation; is followed by a chromate primer and a finish coat of alkyd resin paint.

Single-Pack, Round-Tank Design makes these capacitors small, light, easy to install. Unit has a one-minute discharge resistor; is completely impregnated under vacuum with low temperature Elemex liquid dielectric.

LM® **LINE MATERIAL**

Left: L-M's 5 kvar is 18⅝" high, weighs only 25 lbs. The 3 kvar is 13¾" high, weighs 18 lbs. These weights include the pole-mounting brackets. Standard EEI-NEMA crossarm-mounting bracket furnished if desired.



L-M's unique shipping carton permits inspecting and testing capacitors without removing them from the carton, simply by opening the end flap—which can be resealed.

Small, Light, Easy to Install . . .

L-M's New Secondary Capacitors Provide Needed Vars For Air-Conditioning Loads

Solder-sealed bushings, aluminum metallized finish on tank, and single-pack construction assure long life, low maintenance.

By **BLAINE SCHULTZ**
Section Engineer
Capacitors
Line Material Company

L-M's new secondary capacitor is your solution to the problem of poor voltage regulation and overloaded transformers caused by low-power-factor air-conditioning loads.

The unit is small, light, and rugged; easy to install on crossarm or direct pole mounting. It offers you outstanding design features, such as aluminum metallized tanks, solder-sealed bushings, one-minute discharge resistor, single-pack round-tank construction, and low-temperature Elemex liquid dielectric.

Protective Coating

L-M's unique aluminum metallizing process prevents oxidation of the steel tank and greatly extends the life of the capacitor. This process is followed by a chromate primer and a finish coat of alkyd resin paint. The finish coat is dark in color to facilitate heat radiation and keep the capacitor at low operating temperatures.

Solder-Sealed Bushings

Strong solder-sealed bushings of one-piece wet-process porcelain provide a positive, lasting seal. By eliminating gaskets and clamps we eliminate leakage. Therefore the capacitor can be mounted with bushings up or down.

Pack Construction

The packs are assembled in air-conditioned rooms to assure uniformity and are tested with over-voltage to eliminate any actual or potential defects. The units have a one-minute discharge resistor to assure safe handling and storage.

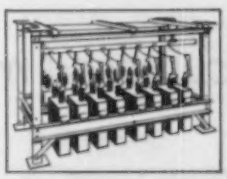
L-M's new 240-volt, pole-mounted, secondary capacitors are available in 3 and 5 kvar. 48-inch leads are furnished and external bushing-mounted indicating fuses can be supplied when required.

Ask us for complete information

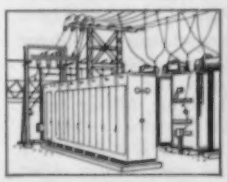
Ask the L-M Field Engineer for complete information on construction and application of L-M's secondary pole-mounted and submersible capacitor equipments, 2400- to 13,800-volt equipments, and our capacitor bank engineering service. Or write Mr. Delaney at Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

Other L-M Capacitor Equipments

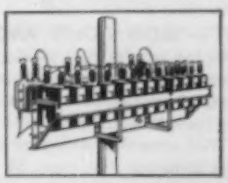
L-M offers a complete line of power capacitor equipments, such as these:



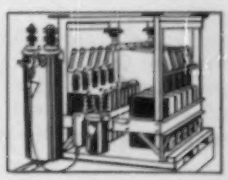
Factory-assembled blocks, which save time and money in building large banks.



Metal-enclosed capacitor equipments in all NEMA-standard sizes and ratings.



Factory-assembled racks for pole-mounted banks, both three-row and single-row styles.



VDS-Method factory-assembled block for multi-step bank switching—an exclusive L-M method that offers a substantial saving on switching equipment.

Also custom-designed protective and switching schemes.

Elemex® Capacitors

a slow speed meter will live longer too!

Whatever you're doing, wherever you are, you'll live longer if you slow down. Slow speed equipment will live longer too . . . because there's less wear, less friction. Thats why the slow speed Sangamo J2 Watthour Meter lasts longer than other meters . . . *because the disk speed of the J2 is a full 40% slower* than the disk speed of any other watthour meter on the market.

The J2 meter with its 6. constant needs less compensation for accuracy from the lightest loads to its full capacity of 100 amperes. And the remarkably good and *uniform* load characteristics of this slow speed design have been proved on utility companies' lines throughout the country.

***DO YOUR PART—"SLOW DOWN AND LIVE"** The nation-wide "Slow Down and Live" traffic safety campaign, sponsored by the National Conference of State Safety Coordinators, is underway and will continue through Labor Day. Started in 1953 by a group of northeastern states, this campaign was so successful, it was extended to 24 states last year. The result: 601 lives saved. The National Safety Council estimates the 1955 campaign among all states will save 1100 lives if as successful as the 24-state campaign last year. So do your part—"Slow Down and Live."

JM55-6

THE J2 METER IS THE SLOW SPEED METER

SANGAMO
ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

MEETINGS CALENDAR

An extended list of coming meetings appears in the last issue of each month

AUGUST

NATIONAL SHADE TREE CONFERENCE—31st Annual Convention, Mar Monte Hotel, Santa Barbara, Calif., Aug. 1-5.

SOUTHEASTERN ELECTRIC EXCHANGE—Personnel Administration Section, Roanoke Hotel, Roanoke, Va., Aug. 11-12.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—Pacific General Meeting, Butte, Mont., Aug. 15-19.

STANFORD RESEARCH INSTITUTE—Symposium on Electronics in Automatic Production, Sheraton-Palace Hotel, San Francisco, August 22-23.

WEST COAST ELECTRONIC MANUFACTURERS' ASSOCIATION—1955 Wescon Show, Fairmount Hotel, San Francisco, August 24-26.

SEPTEMBER

SECOND WESTERN AREA DEVELOPMENT CONFERENCE—sponsored jointly by Stanford Research Institute, the American Industrial Development Council, and the Pacific Northwest Trade Association, Multnomah Hotel, Portland, Ore., Sept. 8-9.

ROCKY MOUNTAIN ELECTRICAL LEAGUE—Annual Fall Convention, Grand Teton Lodge, Jackson Hole, Wyoming, Sept. 11-14.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—2nd Electrical Conference of the Petroleum Industry, Shamrock Hotel, Houston, Tex., Sept. 12-14; Industrial Electronics Conference, Rackham Memorial Auditorium, Detroit, Sept. 28-29.

ILLUMINATING ENGINEERING SOCIETY—National Technical Conference, Cleveland, Sept. 12-16.

INSTRUMENT SOCIETY OF AMERICA—10th Annual Conference and Exhibit, Shrine Exposition Hall and Shrine Auditorium, Los Angeles, Sept. 12-16

EDISON ELECTRIC INSTITUTE—Accounting Division Organization Meeting with American Gas Association, Netherlands Plaza Hotel, Cincinnati, Sept. 13-14; Industrial Relations Round Table Conference, Drake Hotel, Chicago, Sept. 19-21; Industrial Power & Heating Group, EEI Headquarters, New York, Sept. 22-23; Purchasing and Stores Committee, EEI Headquarters, New York, Sept. 26; Transmission and Distribution Committee, Jung Hotel, New Orleans, Sept. 29-30.

ASSOCIATION FOR COMPUTING MACHINERY—Annual Meeting, University of Pennsylvania, Sept. 14-16.

PUBLIC UTILITIES ASSOCIATION OF THE VIRGINIAS—37th Annual Meeting, Greenbrier Hotel, White Sulphur Springs, West Va., Sept. 15-18.

SYMPOSIUM OF ELECTRONIC AUTOMATION—University of Pennsylvania, Irvine Auditorium, Philadelphia, Sept. 19-20.

SOCIETY OF INDUSTRIAL PACKAGING AND MATERIALS ENGINEERS—10th Anniversary Meeting, Kingsbridge Armory, New York, Sept. 19-22.

PENNSYLVANIA ELECTRIC ASSOCIATION—Annual Meeting, Benjamin Franklin Hotel, Philadelphia, Sept. 20-21.

NATIONAL INDUSTRIAL CONFERENCE BOARD—Marketing Meeting, Waldorf-Astoria Hotel, New York, Sept. 21-23.

MISSOURI VALLEY ELECTRIC ASSOCIATION—Accounting Conference, President Hotel, Kansas City Mo., Sept. 22-23.

SOUTHEASTERN ELECTRIC EXCHANGE—Engineering & Operation Section, and Subcommittees, Charlotte Hotel, Charlotte, N. C., Sept. 22-23.

NATIONAL ASSOCIATION OF ELECTRICAL DISTRIBUTORS—Pacific Zone, Annual Convention, Empress Hotel, Victoria, B. C., Sept. 25-28.

SYMPOSIUM ON ELECTRONIC AUTOMATION—University of Pennsylvania, Irvine Auditorium, Philadelphia, Sept. 26-27.

ATOMIC INDUSTRIAL FORUM, INC—1st Trade Fair, Sheraton Park Hotel, Washington, D. C., Sept. 26-30.

STANDARDS ENGINEERS SOCIETY—4th Annual Meeting, Hotel Statler, Hartford, Conn., Sept. 29-Oct. 1.

OCTOBER

EDISON ELECTRIC INSTITUTE—Meter & Service Committee, Hotel Syracuse, Syracuse, N. Y., Oct 3-5; Prime Movers Committee, Hotel Cleveland, Cleveland, Oct. 3-5; Electrical Equipment Committee, Shoreham Hotel, Washington, D. C., Oct. 17-18.

NATIONAL ELECTRONICS CONFERENCE, INC—Hotel Sherman, Chicago, Oct. 3-5.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—Fall General Meeting, Morrison Hotel, Chicago, Oct. 3-7.

PUBLIC INFORMATION PROGRAM—Workshop Conference, Chase-Park Plaza Hotels, St. Louis, Mo., Oct. 5-7.

OKLAHOMA UTILITIES ASSOCIATION—Accounting Section, Lawton, Okla., Oct. 14.

POWER BRIEFS

● Underground installations in Norway will account for one-third of the country's hydro stations by 1959, according to a government white paper.

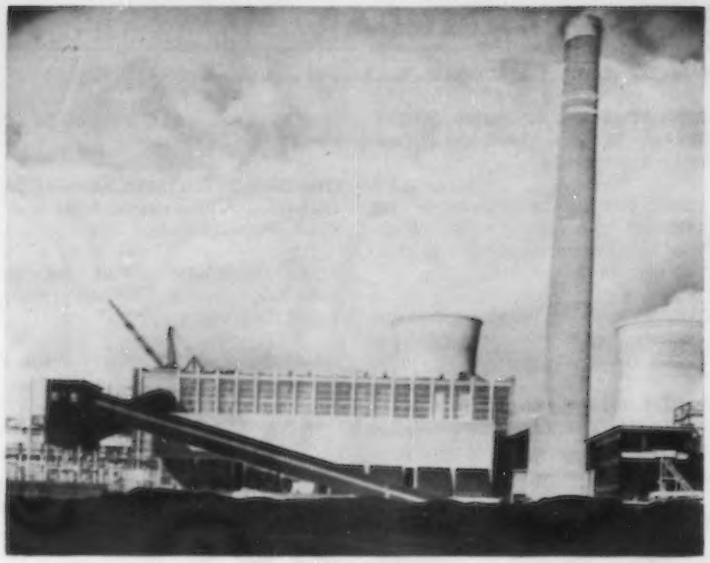
● Rated the nation's most efficient steam power plant for the third consecutive year was Appalachian Electric Power Co's Kanawha River plant at Glasgow, W. Va., according to a report by H. C. Skaggs, Jr, plant manager. He quoted figures not yet generally released by the FPC.

● First application for a license from the Atomic Energy Commission to fabricate nuclear power plant fuel elements has been made by Metals & Controls Co of Attleboro, Mass. Babcock & Wilcox also has announced intention to build for this purpose.

● Dayton Power & Light Co has announced plans for a $21.5-million modernization of its Frank M. Tait generating station in Dayton as the first step toward the plant's 400,000-kw ultimate capacity.

● A $50,000 appropriation to investigate the substitution of underground cables for overhead wiring has received initial approval by the Ways and Means Committee of the Massachusetts State House of Representatives.

● Poland plans to increase its annual power output from 15.1-billion kwhr in 1954 to more than 30-billion kwhr in 1960, according to Pravda, Russia's Communist Party newspaper in Moscow.



Britain Opens Two Coal-Burning Plants

Two new coal-burning plants recently started operation in Britain, one located in the Urban District of Chadderton near Liverpool and the other at Roosecote Sands, some 60 miles farther north. Opening ceremonies were conducted by officials of the Central Electricity Authority.

Chadderton B Power Station (above), with 240,000-kw ultimate capacity, is located on a 95-acre tract much of which was waste land. Weekly coal consumption for the installation has been estimated at 15,000 tons.

Roosecote Power Station (below), on a 110-acre site which includes 40 acres of salt marsh lands, has 120,000-kw capacity. Coal requirements for the plant, on a 20% load-factor basis, have been tabbed at 2,000 tons a week.

British Rate Hike . . .

. . . to cover high coal cost is forecast by CEA; waste 'slurry' burned as experimental fuel

Britain's Central Electricity Authority, in an almost apologetic statement, recently announced that a hike in electrical rates was necessary to cover the increased cost of coal.

The statement, in part, read, "The Central Authority and the Area (Electricity) Board Chairmen have reluctantly concluded that increases in the charges to domestic, commercial, and other users must take place, and proposals for tariff increases will be submitted to the Authority by the Area Boards accordingly."

The increases in electrical rates, the statement concluded, "should take effect from the beginning of October."

In a thorough explanation of the planned rate hike, the Authority cited, as background, recent increases in wages, salaries, and freight rates affecting the "electricity supply industry." "It was hoped," the statement added, "that the industry could carry these increases without having to raise prices generally to electricity consumers. The new coal cost increase . . . now makes this impossible."

Waste 'Slurry' Tried as Fuel

Another recent announcement from Britain indicated that other solutions to the problem of high-priced coal had been sought. The National Coal Board disclosed that it had completed a successful experiment in burning low-grade coal which had been reclaimed from waste ponds by a mechanical-grab device.

The NCB experiment utilized a fully automatic stoker to burn slurry, fine particles of coal and soluble shale rejected from washeries as waste.

Known as the Martin Stoker, the new equipment, which is of German design, has been adapted and installed at Llay Main Colliery in North Wales. It has been consuming about 650 tons of slurry a week which have replaced the 450 tons of washed small coal previously used.

Savings of $2,800 a week have been made as a result of changing the fuel, and the experiment at Llay Main Colliery indicates that raw slurry can be burned satisfactorily in a watertube boiler. Combustion is smokeless.

Taps tight.... can't freeze!

Fully sealed grease chamber prevents corrosion
Heavy stainless steel spring washer compensates for expansion and contraction ... prevents loosening.
Sure-Lok clampstick for installing clamps at extreme angles

KEARNEY
Protected-Thread
CON-NEC-TAP CLAMPS

Months or even years from now, Con-Nec-Taps are as easy to take off as they were to tap on, because the screw threads are completely enclosed in a grease-filled chamber. You'll never need to cut these clamps off the line . . . in fact, you'll save by being able to use them over and over again.

A heavy, double-coil spring washer resists vibration and compensates for expansion or contraction. You are sure of a high-pressure contact under all conditions. Kearney Con-Nec-Tap Clamps are available for all types and sizes of conductors.

New Process Plastic Pole Coating:

KEARNEKOTE* tough, high-dielectric plastic is bonded directly to the wood of KEARNEY Live Line poles.

*Registered Trade Mark. 278R

For Better Construction...Safer Maintenance

Specify **KEARNEY PRODUCTS** *The Mark of Quality*

JAMES R. KEARNEY CORPORATION • 4234-42 CLAYTON AVENUE, ST. LOUIS 10, MISSOURI • Canadian Plant: GUELPH, ONTARIO

H. BRANCH, JR

N. B. GUSSETT

J. W. EVERS

Personnel Policies to be Aired

Harllee Branch, Bernard Gussett, and John Evers are luncheon speakers for EEI's Industrial Relations Committee Round Table Conference in Chicago

Manpower and sound industrial relations policies will be the topics to be discussed by the luncheon speakers at the Eighth Annual Round Table Conference sponsored by the Edison Electric Institute's Industrial Relations Committee. The conference will be held at the Drake Hotel, Chicago, on Sept. 19-21.

Manpower Will be Discussed

Harllee Branch, Jr, president of the EEI and Georgia Power Co, will speak on manpower with particular emphasis on the development of efficient management personnel both as individuals and as members of the team. He will point out that there exists a problem of development of a management performance matching that of the efficiency of our most up-to-date equipment.

At the luncheon on September 20, N. Bernard Gussett, president of the Iowa Power & Light Co, will discuss the economic consequences of the decisions and actions of all employees, particularly those affecting supervisors. He will point out the necessity of thinking through a proposed course of action in order to visualize its economic results.

John W. Evers, president of the Commonwealth Edison Co, will be the speaker at the luncheon on September 21. He will develop the importance of sound industrial relations philosopy policies to a utility company's success and reputation in the communities in which it does business. He will draw upon a lifetime of utility company operation to illustrate how a company's human relations affect all other aspects of the business.

The overall theme of the conference is "Making Personnel Administration Pay Off." Four keynote speakers will present four phases of this theme which will be the subjects of the "How To Do It" discussion groups throughout the balance of the conference.

Subcommittee is Listed

The subcommittee of the Industrial Relations Committee is under the chairmanship of T. G. Ayers, vice president of the Commonwealth Edison Co. Other members of the subcommittee are: K. K. Allen, Southern California Edison Co; C. H. Campbell, Pacific Power & Light Co; J. W. Carothers, Baltimore Gas & Electric Co; J. S. Gracy, Florida Power Corp; and W. H. Senyard, Louisiana Power & Light Co. D. A. Bartlett of Western Massachusetts Electric Co, last year's subcommittee chairman, is an ex-officio member of the committee.

All members of management of the electric light and power industry are cordially invited to attend the conference. Reservations are now being made with E. S. Evans, secretary, Industrial Relations Committee, Edison Electric Institute, 420 Lexington Ave., New York 17, N. Y.

LABOR BRIEFS

International Brotherhood of Electrical Workers—AFL executive council has rejected application for re-instatement by former Vancouver Local 213 Business Agent George Gee. Gee was ousted from the local along with 20 other members for alleged leftist activities during an all-out purge of the union by international headquarters. His final appeal will go to IBEW international convention in 1958.

The Oil, Chemical and Atomic Workers International Union—CIO has formed an Atomic Energy Workers Council. The coordinator is Elwood D. Swisher, international vice president, who said the purpose is to provide the union's atomic energy workers with an opportunity to discuss and work out mutual collective bargaining problems.

"Hold it, Bob!

that 167 Kva Featherweight **POLE STAR** may be light enough to carry up the pole, but regulations say we must use a block and tackle!"

Maybe Bob's feat would strain the muscles of most linemen. But the fact is, Pennsylvania's Featherweight 167 Kva Pole Stars are *30% lighter than standard 167's.* Equipped with standard EEI-NEMA mounting provisions, they weigh in the neighborhood of 1500 pounds.

This means that utilities with power shortages in congested business areas can provide needed additional capacity *without installing heavier poles, platforms, or expensive underground systems.* The 167 Kva Featherweight Pole Star is designed to replace any single phase 75 or 100 Kva pole-mounted transformer . . . providing 67% to 123% more capacity.

The 167 Kva Featherweight offers the inherently low exciting current found in all Pole Star designs. It features the famous Pole Star wound-lapped core, and is available in standard voltages up through 13,200 volts.

For further information on Pennsylvania's 167 Kva Featherweight Pole Star, write, 'phone or wire your nearest Pennsylvania Sales Representative, or contact

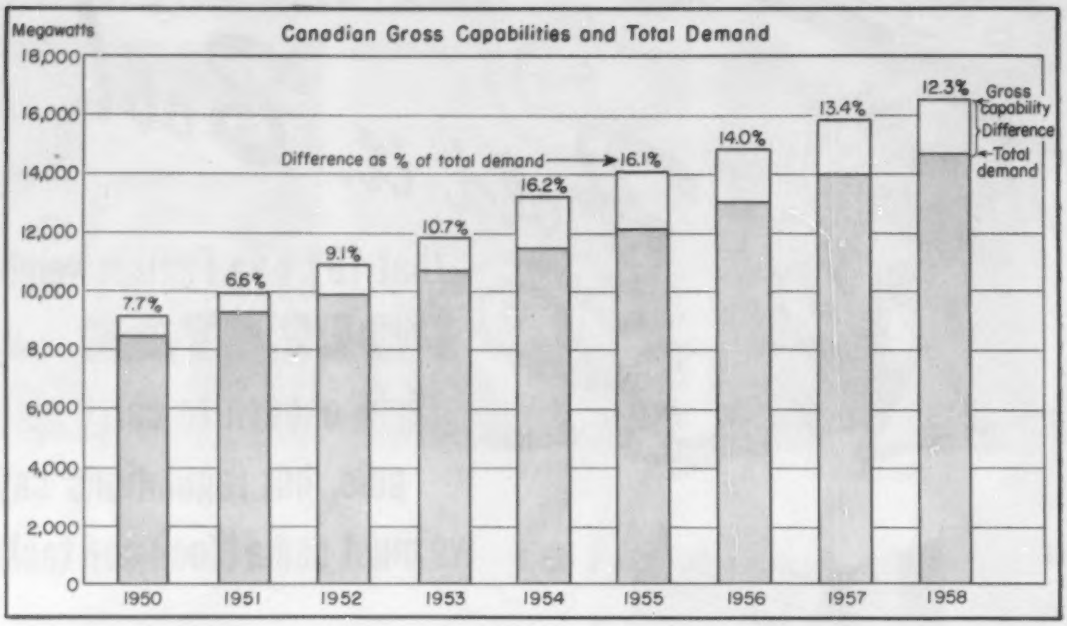
POLE STAR

Distribution Sales Department

Pennsylvania Transformer Company

A McGraw Electric Company Division

pt *Greater Pittsburgh District* . **CANONSBURG, PA.**



First Power Survey Indicates . . .

Canadian Load Growth Easing Off

The First Canadian Power Survey

HIGHLIGHTS . . .

Capability additions (net) of 3.3 million kw are scheduled through 1958, an increase of 25.1% over 1954.

Total demands are expected to increase 3.3 million kw by 1958, 29.6% over 1954.

Thermal generation is expected to be 14.0% of the total (2.3 million kw) by 1958. In 1950 it was only 7.0% (0.6 million kw) And today (1954) it represents 11.0% (1.4 million kw).

CONCEPTS . . .

Survey reports the situation that existed at the time of each company's own customer annual firm peak load, exclusive of any load resulting from the delivery of firm power to other power producing utilities. The full amount of contractual commitments for firm power are reported.

Firm peak load actually measured (1950-1954) has been combined with indicated shortages or rejected load. No attempt has been made to estimate shortages or rejected load for future years.

Total demand for any province consists of its firm peak load (plus any indicated shortage or rejected load) as well as deliveries of firm power to utilities outside the province.

Total demand for Canada consists of demand within provinces plus deliveries outside Canada.

Capability is calculated on the basis of actual operating experience with no deduction for equipment not operating at the time of the annual firm power peak load, and with no allowance for the effect of unfavorable water and ice conditions.

Gross capability for any province consists of the net generating capability (after deducting station service) plus the purchase of firm power under firm obligation form utilities outside the province.

Gross capability for Canada consists of the net generating capability of all the provinces plus purchases from outside Canada.

Canada's load growth is expected to slow down, the first Canadian Electric Power Survey indicates. Increases in total demand, 7.4% a year from 1950 to 1954, are expected to reach only 6.7% a year in the 1954 to 1958 forecast. The growth of gross capability, 9.5% a year from 1950 to 1954, is considerably greater than the 5.8% a year expected through 1958.

The results of this report were compiled from returns filed by 82 power producers. These companies generate approximately 98% of Canada's utility output. The survey was organized and carried out by the Dominion Bureau of Statistics in cooperation with the Canadian Electrical Association. Its organization and planning follows the general pattern, concepts and procedure of the semi-annual power survey conducted by the Edison Electric Institute.

For most provinces the forecasts indicate a smaller increase in load and capability in the years ahead (1954 to 1958) than was actually experienced from 1950 to 1954. Saskatchewan and Alberta are expected to lead Canada with increases in gross capability of more than 50% during the next four years.

Canadian Capability of Demands

	Thousands of Kw									Percent Increase 1950–1954	Percent Increase 1954–1958
	1950	1951	1952	1953	1954	1955	1956	1957	1958		
Newfoundland											
Gross Capability	186	198	198	215	221	224	245	245	264	18.8	19.5
Total Demand	175	180	184	193	200	205	216	221	225	14.3	12.5
Difference	11	18	14	22	21	19	29	24	39	.....	.....
(% Demand)	(6.3%)	(10.0%)	(7.6%)	(11.4%)	(10.5%)	(9.3%)	(13.4%)	(10.9%)	(17.3%)	.....	.....
Prince Edward Island											
Gross Capability	10	18	18	18	18	18	25	26	26	80.0	44.4
Total Demand	8	8	9	10	11	11	12	13	14	37.5	27.3
Difference	2	10	9	8	7	7	13	13	12	.....	.....
(% Demand)	(25.0%)	(125.0%)	(100.0%)	(80.0%)	(63.6%)	(63.6%)	(108.3%)	(100.0%)	(85.7%)		
Nova Scotia											
Gross Capability	207	246	269	298	316	381	373	444	444	52.7	40.5
Total Demand	167	187	215	239	248	292	312	356	370	48.5	49.2
Difference	40	59	54	59	68	89	61	88	74	.....	.....
(% Demand)	(24.0%)	(31.6%)	(25.1%)	(24.7%)	(27.4%)	(30.5%)	(19.6%)	(24.7%)	(20.0%)		
New Brunswick											
Gross Capability	168	174	182	220	220	219	220	283	317	31.0	44.1
Total Demand	156	162	174	181	189	207	220	238	255	21.2	34.9
Difference	12	12	8	39	31	12	.....	45	62	.....	.....
(% Demand)	(7.7%)	(7.4%)	(4.6%)	(21.5%)	(16.4%)	(5.8%)	.....	(18.9%)	(24.3%)		
Quebec											
Gross Capability	4,305	4,564	4,856	5,280	5,363	5,533	5,785	6,114	6,284	24.6	17.2
Total Demand	3,890	4,181	4,471	4,668	4,787	4,968	5,191	5,392	5,578	23.1	16.5
Difference	415	383	385	612	576	565	594	722	706	.....	.....
(% Demand)	(10.7%)	(9.2%)	(8.6%)	(13.1%)	(12.0%)	(11.4%)	(11.4%)	(13.4%)	(12.7%)		
Ontario											
Gross Capability	3,217	3,478	3,917	4,138	4,719	5,187	5,204	5,476	5,504	46.7	16.6
Total Demand	3,287	3,607	3,800	4,014	4,246	4,557	4,830	5,091	5,278	29.2	24.3
Difference	−70	−129	117	124	473	630	374	385	226	.....	.....
(% Demand)	(2.1%)	(3.6%)	(3.1%)	(3.1%)	(11.1%)	(13.8%)	(7.7%)	(7.6%)	(4.3%)		
Manitoba											
Gross Capability	500	501	593	608	657	694	695	751	780	31.4	18.7
Total Demand	432	473	491	530	551	589	619	650	679	27.5	23.2
Difference	68	28	102	78	106	105	76	101	101	.....	.....
(% Demand)	(15.7%)	(5.9%)	(20.8%)	(14.7%)	(19.2%)	(17.8%)	(12.3%)	(15.5%)	(14.9%)		
Saskatchewan											
Gross Capability	210	242	253	278	324	362	425	427	507	54.3	56.5
Total Demand	175	193	213	238	267	294	321	345	369	52.6	38.2
Difference	35	49	40	40	57	68	104	82	138	.....	.....
(% Demand)	(20.0%)	(25.4%)	(18.8%)	(16.8%)	(21.3%)	(23.1%)	(32.4%)	(23.8%)	(37.4%)		
Alberta											
Gross Capability	191	271	281	349	399	448	543	544	613	108.9	53.6
Total Demand	179	225	240	292	310	360	406	456	512	73.2	65.2
Difference	12	46	41	57	89	88	137	88	101	.....	.....
(% Demand)	(6.7%)	(20.4%)	(17.1%)	(19.5%)	(28.7%)	(24.4%)	(33.7%)	(19.3%)	(19.7%)		
British Columbia											
Gross Capability	925	984	1,053	1,103	1,672	1,710	1,984	2,201	2,434	80.8	45.6
Total Demand	803	855	925	1,016	1,273	1,360	1,566	1,888	2,100	58.5	65.0
Difference	122	129	128	87	399	350	418	313	334	.....	.....
(% Demand)	(15.2%)	(15.1%)	(13.8%)	(8.6%)	(31.3%)	(25.7%)	(26.7%)	(16.6%)	(15.9%)		
Yukon & Northwest Territories											
Gross Capability	21	21	24	24	24	24	24	26	26	14.3	8.3
Total Demand	14	14	16	17	18	18	19	19	20	28.6	11.1
Difference	7	7	8	7	6	6	5	7	6	.....	.....
(% Demand)	(50.0%)	(50.0%)	(50.0%)	(41.2%)	(33.3%)	(33.3%)	(26.3%)	(36.8%)	(30.0%)		
Canada											
Gross Capability	9,146	9,890	10,833	11,719	13,139	14,004	14,769	15,784	16,446	43.7	25.2
Total Demand	8,492	9,278	9,927	10,586	11,306	12,065	12,958	13,916	14,647	33.1	29.6
Difference	654	612	906	1,133	1,833	1,939	1,811	1,868	1,799	.....	.....
(% Demand)	(7.7%)	(6.6%)	(9.1%)	(10.7%)	(16.2%)	(16.1%)	(14.0%)	(13.4%)	(12.3%)		

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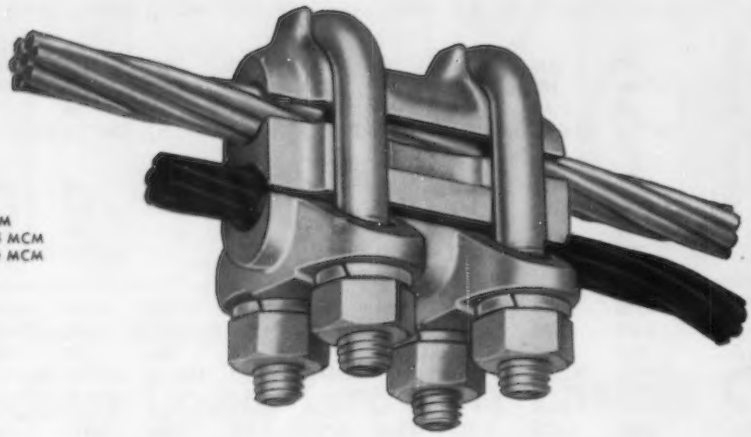

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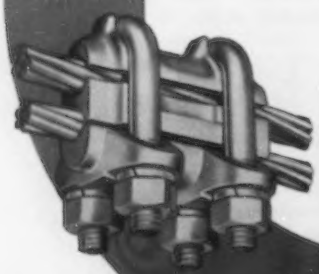
Sizes available to accommodate ACSR 2—336.4 MCM Alum. 1 Str.—397.5 MCM



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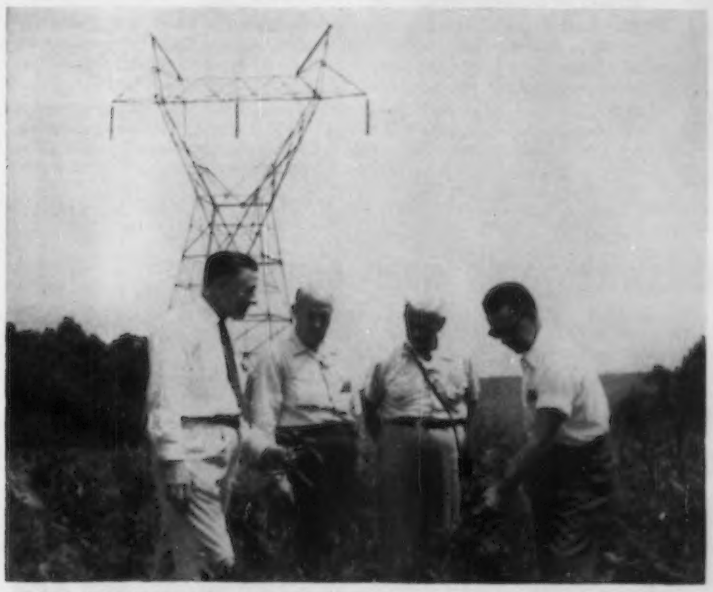
Speakers at Brush Control Conference plus . . .

DR. WILLIAM C. BRAMBLE, left; Ralph I. Kauffman, program chairman; Maurice K. Goddard; Lester Asplundh; Robert H. Beatty; and Dr. A. E. Carlson

Examination of desirable growth surviving prove . . .



DALE H. SWANSON, left, Asplundh Tree Expert Co; S. M. Richards, Long Island Lighting; L. E. Lockwood, Commonwealth Edison; R. M. Latham, Game Com.

Sprays OK for Clearing R-O-W

The Chemical Brush Control Conference, July 7 and 8, at Pennsylvania State University, is viewed in retrospect by its participants as paving the way for wider use of chemical sprays for clearing power company rights-of-way. The conference was arranged by the Asplundh Tree Expert Co in cooperation with Dr William C. Bramble, professor of forestry at the PSU School of Agriculture.

Use of chemical sprays is admittedly the cheapest way of keeping rights-of-way clear of vegetable growth interfering with power lines. Tests conducted by the College of Agriculture since 1953 on a section of new power line right-of-way of the Pennsylvania Electric Co have provided data on the chemical treatment of plants.

"A replicated series of treatments have been set up on a three-mile section of a power line right-of-way, designed to compare the effects of the spray application on game food and cover of an upland oak-hickory forest cover type," Bramble told the conferees.

"Wildlife usage of the sprayed areas after treatment has indicated that the right-of-way is still attractive to game species and that small game, in particular, may be expected to increase as the plant cover develops."

The data derived from the PSU tests, according to J. E. Ibberson, chief of the division of research, Pennsylvania Department of Forests and Waters, have provided grounds for a state policy based on the greatest good to the greatest number.

Pointing out that control of right-of-way growth can be a tremendous asset to conservation, Ibberson proposed specifications for the treatment of various trees and shrubs. These enumerated the species that may be chemically treated along the entire right-of-way, those to be treated only on the center portion, and those to be left untreated.

Significance of the conference lies in the fact that it brought together and revealed basic agreement among groups that heretofore did not always see eye-to-eye on the destruction of woodland vegetation.

Roland P. Borden, general superintendent, New Jersey Power & Light Co, pointed out that transmission rights-of-way through some 2,638 acres of what was originally brush are now controlled with chemical spray. He noted that since 1950, the cost per acre of controlling the brush has gone steadily downward.

In addition to those cited speakers included: Roger M. Latham, chief of the wild life division, Pennsylvania Game Commission; and Maurice K. Goddard, secretary of the Pennsylvania Department of Forests and Waters. The following also spoke: Ralph I. Kauffman and Hyland R. Johns, Asplundh Tree Expert Co; Robert H. Beatty, American Chemical Paint Co; and, Dr A. E. Carlson, E. I. du Pont Nemours & Co.

SWITCHGEAR NEWS

NEWS OF SWITCHGEAR DEVELOPMENTS OF IMPORTANCE TO THE ELECTRICAL INDUSTRY

New Analog Computer Aids G-E Switchgear Research

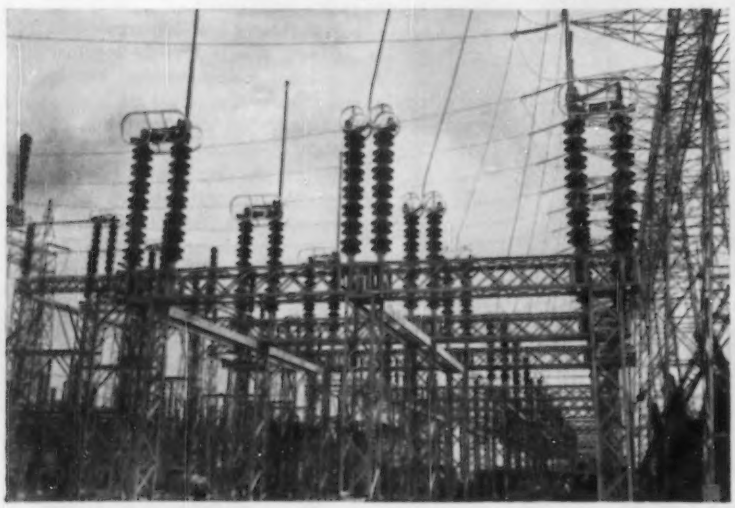
During its first year of operation the analog computer has proved to be an extremely useful tool in speeding General Electric switchgear research. Its primary function is to investigate the performance of a wide variety of mechanical systems used in G-E switchgear products. In addition to saving a great deal of time, the new computer has given G-E designers vital data unobtainable by other methods.

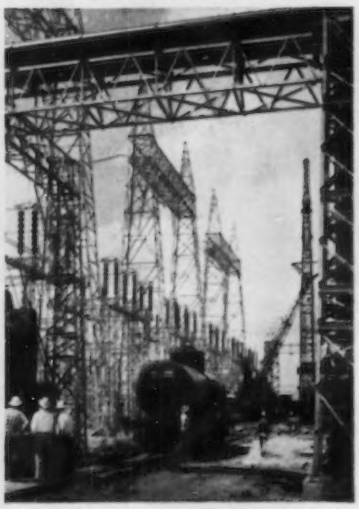
Among the important contributions made by the new computer was the verification of the design of the new high-speed distribution breaker described on the next page.

Many other problems are now under consideration which will ultimately result in improved switchgear performance. Among them is investigation of the contact bounce phenomena in the cup-type relay. Results of this study should make it possible to increase contact efficiency and life.

G.E.'s speeded-up research program has resulted in increasingly complex problems being handed to the computer. To keep up with this increasing load, new additions have been made to the original installation, until today, the computer, with a total of 12 integrators, is able to represent a six-degree-of-freedom system.

Nation's largest switchyards near completion





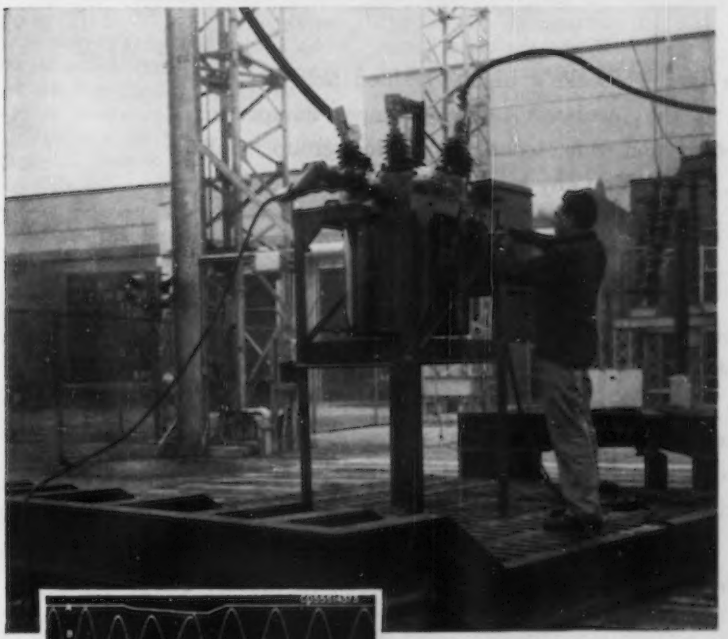
Two of the largest and highest voltage outdoor substations ever built, rated at 1,000,000 and 1,300,000 kva, each including approximately 800 tons of steel and covering approximately 13 acres, are now under construction for an important AEC project. The switching structures of the 330-kv substations were designed and furnished by the General Electric Company's High Voltage Switchgear Department at Philadelphia. They will be used for switching the large amounts of power required for a new installation.

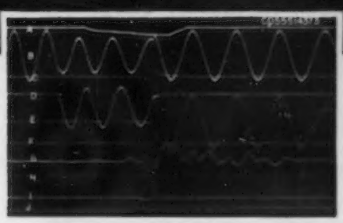
The stations utilize a total of 114 air switches rated 330 kv, along with a number of the new 25,000,000 kva interrupting capacity power circuit breakers. Aluminum buses are used throughout the stations and designed to carry a continuous current of as much as 2000 amps. More than 4000 strain insulators and 6000 bus and switch insulators were required for each station.

General Electric announces . . .

NEW 5-cycle distribution breaker

High-speed Interruption Minimizes Chance of Line Burn-down, Offers Closer Co-ordination of Fuses





New breaker has been subjected to extensive full scale power and capacitance switching tests at G-E Development Laboratory. Oscillograms consistently show better than 5-cycle interruption.

A new oil power circuit breaker for distribution system application is now in production at General Electric's High Voltage Switchgear plant in Philadelphia.

Rated to interrupt distribution loads in 5 cycles at 14.4 kv, the new breaker offers distribution engineers the opportunity of increasing transformer sizes to meet load growth without need for changing to a heavier wire system.

On systems using 1/0 wire, for example, the new breaker would permit transformer capacities to be increased 68% over burn-down values considered safe for the standard 8-cycle breakers now in use. Faster interruption will also enable better fuse protection of distribution equipment because smaller ratings of co-ordinated fuses may be applied.

To achieve smooth, positive closing, G-E engineers teamed a stored-energy torsion spring with a low-impact cam-drive mechanism. The mechanism is both mechanically and electrically trip-free and can provide instantaneous initial reclosing even if closing power supply is unavailable.

Powered by a 400-watt universal motor, the spring charged mechanism eliminates the need for heavy closing power supply sources normally required with distribution breakers.

The new, stronger cylindrical tank breaker requires 26% less station space than did the previous square tank breakers. Six bayonet type interrupters are incorporated in the single-tank construction.

The higher-speed 5-cycle breaker supersedes G.E.'s 8-cycle Type FLO breaker and is being introduced at no increase in price.

For further information, see your General Electric representative, or complete the bulletin-request coupon on this page.

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Get 'Em All into AW Act

Nine local AW units, organized with help of banks and industry, spearhead Public Service E&G's rewiring campaign

Big (1,298,000 customers) Public Service Electric & Gas Co had a problem. It knew the homes in its heavily-populated service area are sadly outdated in their wiring. It knew it was in need of some sort of adequate wiring program.

But it also had some other definite ideas: (1) It did not want to get into the financing business when and if it set up a wiring finance program; (2) it felt that chances of any AW program succeeding would be better if it got as many industry allies interested as possible.

With this in mind, Public Service set up a series of meetings with New Jersey's Bankers Association, Savings and Loan League, Council of Electrical Leagues, and representatives of the equipment manufacturers and distributors. The purpose: To sell them on the need for adequate wiring.

Decentralized Activities

Meetings were well attended and the material well received. The result was the formation of an Adequate Wiring Bureau, chartered by the National Adequate Wiring Bureau in New York. In order to obtain better infiltration and more cooperation, the bureau was divided into nine separate units covering the 11 New Jersey counties that make up Public Service's territory.

These bureaus are managed by a ten-man executive committee composed of local representatives of various interested groups. Members of these committees were designated by local associations, with a Public Service man acting as secretary on each committee. After their formation, the local bureaus held meetings with the contractors and financial institutions. Next step was the opening of a campaign by the Adequate Wiring Bureau. It consisted of a 13-week program of advertising in 16 daily and 8 weekly newspapers. Backing it up, Public Service moved in with a campaign of its own, using billboards, bus posters, floor and window displays.

After the local bureaus held their meetings with contractors, kits were sent out to all contractors in the area describing the need for the campaign, the methods of promotion to be used to assist the contractor, and suggested promotional methods he might use to sell adequate wiring to customers. The kits also indicated how the contractor could identify himself with the campaign by running his name and address in the same media used by the bureau for its advertisements. Other kits were sent to the participating financial institutions.

The campaign started May 1. Although it is too early to ascertain definite results, interest among participants runs high. Banks and saving and loan associations are requesting large quantities of promotion material as are contractors. Even manufacturers and distributors are requesting material which they can send to customers.

Men Read AW Ads Best

Men read adequate wiring advertising almost twice as carefully as women Kennecott Copper Corp has discovered in a readership study of its current AW ad campaign.

Better Lights for a Fast Highway

Linemen hang one of 384 20,000-lumen mercury-vapor street lights now in service on eight-mile stretch of Connecticut's heavily-traveled Berlin Turnpike. Installed by crews from Connecticut Light & Power and Hartford Electric Light Co they replace 15 sodium-vapor units of 10,000 lumens each. A special commemorative plaque "dedicated to safety" was unveiled at recent turning-on ceremonies. Driver of 55th car to pass under new lights was presented $300 in merchandise "to spotlight 1955 as the beginning of new safety for turnpike travelers." It is the largest single stretch to be lighted under state highway department sponsorship.

MANUFACTURERS AND MARKETS

US Steel Ships Reel of 12,475-ft Cable

A 12,475-ft submarine cable was recently shipped in one continuous length from the American Steel & Wire Division of the US Steel Corp in Worcester, Mass., to Central Maine Power Co.

The 3-conductor, No. 2 copper AWG, 15-kv, rubber-insulated, nonleaded, steel-wire armored submarine cable is 2.9 in. OD and will be used to supply 12.4-kv, 3-phase service.

The utility installed the cable between Northport on the mainland and Islesboro Island over two miles away in Penobscot Bay, Maine. It replaced a 30-year old cable from Castine, servicing a year-round population of about 550 and in summer about 1,000.

A steel reel 10 ft in head diameter and 18 ft long was used to ship the one-piece cable. The loaded reel, weighing 63 tons, was shipped to Bath Iron Works plant in Maine on a 6-ton steel cradle 10 ft wide and 24 ft long. This reel was then transferred to a barge which was towed to the installation site.

In the illustration the cable is shown starting off the reel at Islesboro. It was winched ashore by line truck on the island. Men on left and right of reel manned brake levers. Average depth of the channel is from 90 to 120 ft with the maximum being 220 ft at the deepest point.

The older cable will be retained for an emergency feeder. A 219-kva internal combustion engine generator unit is retained for emergency service on the island.

Kaiser Has Triplex Cable, Aluminum Alloy Neutral

A triplex electrical conductor with an aluminum alloy neutral is introduced by Kaiser Aluminum & Chemical Corp, Oakland, Calif. In the new type triplex self-supporting service drop cable, the EC aluminum or ACSR neutrals are replaced by an aluminum alloy messenger fabricated from an alloy with properties similar to aluminum alloy 6061.

This triplex cable provides the lighter weight of an EC aluminum neutral with the tensile strength about equal to that of the same conductance ACSR, according to a report.

Price of the new product is slightly higher than the same triplex construction with an equivalent ACSR neutral. However, because of the savings in using simple connectors and in labor, the installed cost is expected to show a saving per service installation, as compared with use of ACSR neutral, according to Kaiser engineers.

Transistors by Motorola

Motorola Inc is constructing a 57,600 sq ft plant in Phoenix, Ariz. for the research, development and production of transistors and other semi-conductor devices. The facilities are expected to be completed by year's end.

Westinghouse Organizes Industrial Heat Division

Formation of an industrial heating division in Westinghouse Electric Corp has been announced by John K. Hodnette, vice president and general manager of industrial products.

The new unit will combine the company's induction heating activities located at Baltimore, Md., and the industrial heating department, located at Meadville, Pa. Headquarters of the new division will be at Meadville, Pa.

L. R. Hague has been appointed manager of the industrial heating division. William Sprenger will continue as works manager of the industrial heating department operations.

Products to be manufactured within the division include general industrial furnaces, heaters and thermostats at Meadville, and induction heating apparatus at Baltimore.

American Atomic Industry to Hold First Trade Fair

Sixty-five American manufacturers, industrial organizations and a group of U. S. and foreign governmental agencies, have reserved exhibit space in the first U.S. Trade Fair of the Atomic Industry. The Fair will be held in Washington, D. C., September 26 to 30, under the auspices of the Atomic Industrial Forum, Inc., 260 Madison Avenue, New York 16, N. Y.

The Trade Fair is being held in conjunction with the Annual Fall meeting of the Forum at the Sheraton-Park Hotel and concurrent sessions of the American Nuclear Society.

The Fall meeting and the Trade Fair will follow closely the United Nations International Atomic Energy Conference in Geneva, Switzerland, and its attendant atomic exhibition.

GE Ups Inductrol Ratings

General Electric Co's Power Transformer Dept. at Pittsfield recently announced higher ratings for Inductrols (dry-type induction voltage regulators). The new ratings are said to permit application of single-phase regulators on circuits up to 240 kva and three-phase regulators to 720 kva.

(*More M & M on page* 59)

Here's Proof of Performance...

Pressure-creosoting increases pole life for Consumers Power Company

• In 1931, Consumers Power Company, serving 64 Michigan counties, stopped the use of untreated and butt-treated poles in its rural distribution systems in favor of pressure-creosoted poles. Today approximately two-thirds of the company's poles in electric distribution lines are pressure treated, 80% of those being full length pressure-creosoted Southern Yellow Pine.

The average cedar pole, used until 1931, had a normal life expectancy of 23 to 25 years at the most. The life expectancy excluding losses for other than natural causes, of the pressure-creosoted Southern Yellow Pine poles being purchased today is probably upwards of 40 years, according to George A. Clark, Electric Distribution Supervisor.

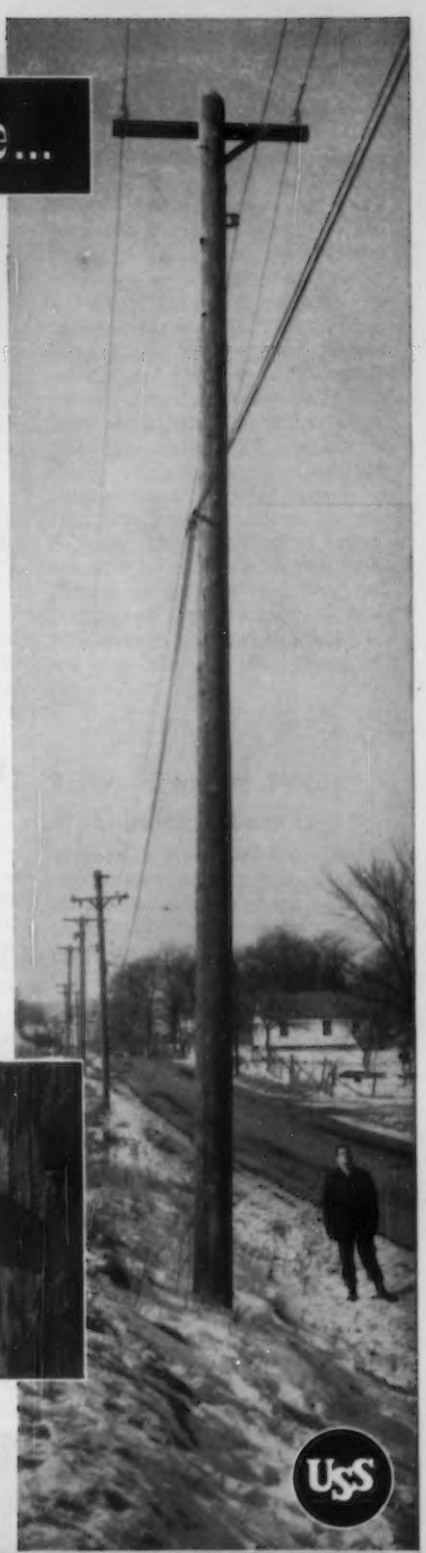
Pressure-creosoting, according to Mr. Clark, gives positive penetration averaging over 80% of the sapwood and with the use of modern vacuum processes after treatment, today's poles are dryer and cleaner.

In the company's scheduled maintenance program, its full-length pressure-treated poles are not to be given a boring inspection until they have been in service 25 years.

Long life and cleanliness go hand in hand when you use pressure-creosoted poles. Especially if USS Creosote is used. If you would like more information, contact the nearest Coal Chemical sales office listed below or write directly to United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa.

You can obtain clean pressure-creosoted poles upon specification without sacrificing pole service life.

Close-up, at right, of a Consumers Power Pole, showing 1937 dating nail.



Pressure-creosoted poles in a rural line of Consumers Power Company, Jackson, Mich.

USS CREOSOTE

SALES OFFICES IN PITTSBURGH, NEW YORK, CHICAGO, CLEVELAND, SAN FRANCISCO AND FAIRFIELD, ALA.

UNITED STATES STEEL

THIS IS A ONE-PIECE PORCELAIN

This is the interrupter unit for a porcelain-clad 230 Kv oil-blast breaker. It is, we believe, one of the largest pieces of top-quality electrical porcelain ever produced. Strictly a homogenous one-piece porcelain, it has no glazed joints or other interruption of the continuous porcelain body. It is 112″ long, has 246″ leakage distance and weighs 1325 pounds. It will be supplied with large heat-treated cast aluminum flanges, and with ends ground for gasketing.

Visitors to the Lapp plant find the production rows of these units an impressive sight. We're proud of them, too—mostly because they dramatize and emphasize our often-repeated claim. Lapp experience . . . Lapp techniques of production and control . . . Lapp enthusiasm for the manufacture of sound porcelain . . . add operating security and long life to the systems on which Lapp insulators are installed.

Lapp Insulator Co., Inc., Le Roy, N. Y.

Lapp

IBM Opens New Data Processing Center

A new electronic data processing center has been opened by International Business Machines Corp at its headquarters in New York City. Outstanding feature is IBM's 702 electronic data processing machine designed for major commercial and industrial applications. In the illustration an operator is shown giving instructions to this "giant brain." In the background are eight 2,400-ft magnetic tapes through which information is fed to and delivered from the machine at the rate of 15,000 characters per second. Several units of the machine are not shown. The machine may be used in the center at a basic hourly charge of $445.

Other data processing machines in the new center are: A 701 for large scale scientific and engineering calculations (to be succeded late in 1955 by a 704 for both business and scientific work); a 650 magnetic drum machine for similar work on a smaller scale (having a punched card input and output and will be available as a tape-operated machine with a printer output); also smaller, medium-sized calculators, as well as a Transceiver for long-distance transmission of data from district offices to central office.

T. V. Learson, vice president in charge of sales told newsmen that IBM business for the first six months of 1955 was a record volume for the company. IBM's backlog of orders, he said, is larger than it has ever been. Delivery is the best they have had even though extensive additions have been made to manufacturing facilities, and new machines have been developed.

Raffi & Swanson Opens New Finishing Plant

The new, million-dollar plant of Raffi & Swanson, Inc., Wilmington, Mass., is in operation and marks 30 years of experience in product finishing. Charles L. Raffi is president and Martin S. Swanson is treasurer.

This new plant is a 14-building layout on a 15-acre site. The site was chosen because of its advantage as a distributing point. The plant is considered an example of progress in modern safety engineering. A Research Laboratory has facilities for formulating and evaluating surface coatings.

Here are produced industrial finishes such as baking enamels; thinners, and lacquer finishes for motors, meters, instruments, and appliances; conductive coatings; and high tension cable coatings; also finishes for textiles, wood, leather, paper, and plastics.

U. S. Copper Production

Primary copper production in the United States, reported by the Copper Institute, New York, N. Y., was 91,458 tons in June, a decrease of 3,584 tons from 95,042 tons in May. Refined copper production was 131,431 tons in June, down 4,611 tons from May. Deliveries to fabricators was 132,842 tons in June, the greatest monthly amount this year. And it is an increase from 124,853 tons in May. For the six months in 1955 the average monthly delivery was 121,894 tons. Refined stocks amounted to 38,533 tons in June, the lowest this year, and down 5,539 tons from 43,340 tons in May.

A-C Earnings Report

Allis-Chalmers Manufacturing Co reports for the six months ended June 30, 1955, net earnings $12,562,932 as compared with $13,490,505 for the same period in 1954. Balance available for common stock was $12,000,142, or $3.08 per share on 3,900,111 shares outstanding as of June 30. For the like 1954 period, balance available was $13,126,937, or $3.94 per share on 3,329,601 shares outstanding. Net sales billed through June 1955 was $267,040,844, compared with $258,867,531 for the same 6-month period in 1954. Unfilled orders as of June 30, 1955, amounted to $142 million as compared with $169 million as of June 30, 1954. Orders of the tractor group are not booked until billed.

B&W Increases Prices of Tubular Products

Revision in prices covering seamless carbon, alloy, and stainless, mechanical and pressure tubes have been announced by J. S. Anderson, general sales manager, Tubular Products Division of Babcock & Wilcox Co.

The revised prices are effective with shipments made on and after July 11, 1955, and reflect increases in costs due to increases in labor rates and raw materials. Details of these prices are available in revised price schedules which are being issued and will be distributed very soon.

Aluminum Production

Primary aluminum production in the United States, as reported by the Aluminum Association in New York, was 127,632 tons in June, a decrease of almost 3,500 tons from May but an increase of over 7,000 tons over June, 1954. Total production was 759,866 tons, or an average per month of 126,644 tons, through June this year. This is in comparison to 715,398 tons, or an average per month of 119,233 tons for the first six months in 1954.

BUSINESS OUTLOOK

Electrical World
AUGUST 1, 1955

The outlook, in brief: Still setting records. Industrial production hung up a new record—139 on the FRB index, seasonally adjusted—in June. Rising factory payrolls have pushed personal incomes to a new all-time high. And business is optimistic about 1956, an election year, when tax-cuts are expected. The construction industry continues to pace the surge in industrial activity.

Still, mounting inventories could cause trouble. The build-up in stocks is not yet serious. But they might build up fast from here on out. This would signal a slow-down in production of some lines in coming months. The point is that industrial production in the first half-year went mostly into consumption. Now some is going into inventories.

Manufacturing, wholesale and retail inventories rose $600 million to top $78 billion in May—the latest official figures available. That's an annual rate of increase of $7 billion, close to the rate in mid-1953. And stocks undoubtedly continued to rise in July.

The inventory build-up in 1953 heralded the recession of 1954. This time, though, sales are running several billions higher. Then too, personal income is higher now than in 1953. So the ratio of sales to inventories is not yet out-of-line. But some observers believe that it will be soon.

The build-up in stocks is mostly of durable goods—especially steel, autos and appliances:

▶ Some orders for steel were placed as a hedge against a steel strike, others in anticipation of the steel price rise. That means that demand for steel should fall off. Not much, but enough to put a crimp in the current business boom.

▶ Auto companies will take less steel in this second half. There'll be little difference between the 1956 models and the 1955's. So the surge in consumer demand for cars that sparked the boom in early 1955 isn't likely to be repeated in 1956. Hence car assemblies in the last quarter of 1955 and first half of 1956 will not equal the record output—about 8 million at an annual rate—produced in late 1954 and early 1955. A decline in auto production, further, means less demand for steel.

▶ Stocks of unsold cars are not yet too high relative to sales. Makers still expect an orderly 1955 model clean-up. But the situation in autos could change fast if sales lag.

▶ Inventories of electric appliances are higher than a year ago. Stocks of radio and TV sets are between 200,000 and 300,000 higher. An exception is stocks of air conditioners. The hot-weather has sent them plunging.

One offset to the build-up in inventories is the continued boom of the construction industry. New housing starts are slackening slightly—from about 1.4 million (at an annual rate) in the first half to about 1.3 million now. But **proposed** new construction of public and commercial facilities is astoundingly high. It's running over 60% ahead of a year ago for bridges, highways, shopping centers and some other facilities.

OPERATION VOLTAGE REPORT NO. 2

Key facts in the application of regulators and capacitors

FIG. 1

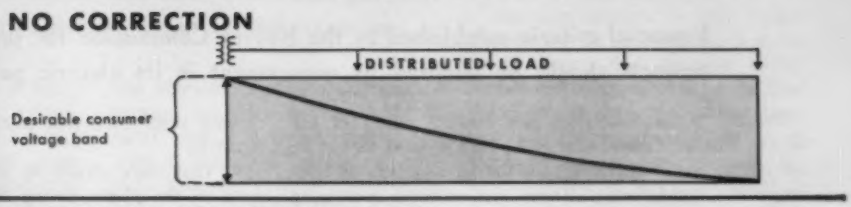


FIG. 2

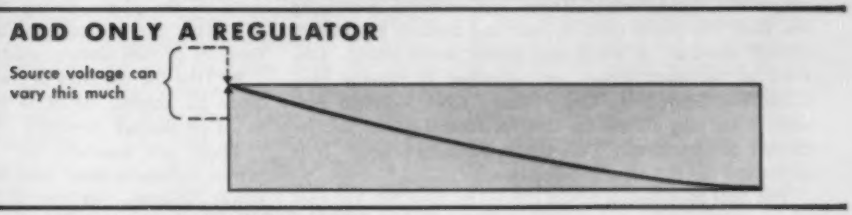


FIG. 3

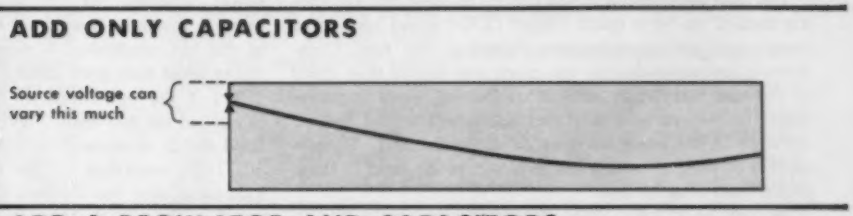
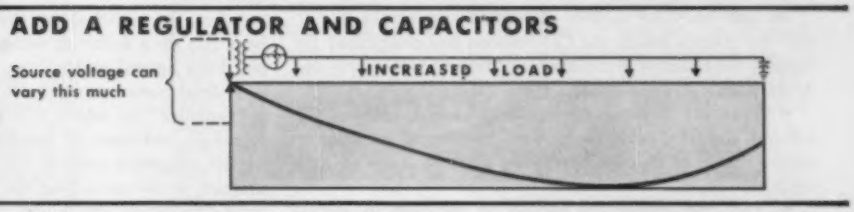


FIG. 4



What happens to system voltage when capacitors and regulators are installed?

Figure 1 shows a full-load voltage profile along a distribution feeder with no voltage corrective devices. Figure 2 shows how a voltage regulator is capable of bucking and boosting varying source voltage so as to maintain voltage within limits all along the feeder.

Figure 3 shows what happens when only a switched capacitor bank is added to the feeder: The voltage spread along the feeder is reduced and additional feeder loading is possible.

Figure 4 shows the result of the addition of voltage regulators and switched capacitors: When used together, they provide an ideal means of accurately controlling voltage and increasing system capacity for additional load. This produces satisfied customers, as well as providing the best return on system investment.

In fact, for all systems, the use of capacitors and regulators ***always*** results in superior voltage control and greater system load carrying capacity.

G-E engineers have just completed a comprehensive study of the problems of feeder voltage regulation. This report is the second in a series dealing with the important results of the study. If you would like to discuss voltage problems on your system, contact your G-E Apparatus Sales Engineer. General Electric Co., Schenectady 5, N. Y. 665-2

Portable demonstrator being used by G-E Engineers R. M. Butler and D. R. Samson to show effect of capacitors and regulators under variety of feeder load conditions.

GENERAL ELECTRIC

IN THE INDUSTRY

Let's End the Industry's Double Standard

Financial criteria established by the Hoover Commission for judging federal projects should be adopted by government in its electric power activities

Recent "Water Resources and Power" report of the Second Hoover Commission (EW, July 4, p 8) should be put on the required reading list for all members of electric utility management. These two volumes containing less than 300 pages form a clear and concise analysis of federal activities in water and power development. Dissents to the main report are contained in volume two. California Democratic Congressman Chet Holifield presents in his long dissent the case for federal power policies carried out by former Democratic Administrations. It is important for the view it represents.

The final commission report carried in these two volumes are backed up by a much longer (1,800 page) task force report and recommendations. Although the final Commission recommendations are much less drastic than those of the task force, they offer a number of broad improvements in respect to policy and administration of federal activities in the water resource development field. Various aspects of these recommendations will be discussd in these pages from time to time.

As one basis for further discussions we would like to cite the criteria which the Commission has established for judging the financial performance of federal power projects. Main points of these criteria are:

- "That the Federal Government should receive 3% interest annually upon its (power) investment in order to assure return of its own borrowing costs on loans of such length.
- "That the investment should be returned in annual installments (amortized) in not more than 50 years for hydroelectric plants and 35 years for steam plants.
- "That capital costs of each project should include all such costs as preliminary investigation, design, acquisition of land and water rights, relocation of facilities, etc., including supervision and interest on capital during construction.
- "That there should be annual provision for replacement of the plants during the amortization period.
- "That the projects should pay local taxes equal to those of private electric utilities.
- "That the earnings of the Federal projects should include an amount equal to the Federal tax exemptions, based on the tax payments of private utilities."

These are basically the financial conditions which private enterprise must meet in planning and expanding its power facilities. An electric company that fails to meet them is certainly headed for trouble. With the exception of the tax conditions, a municipal or other non-federal utility must also meet these.

Yet if the operations of federal power projects were calculated on this basis, they would have had an accumulated deficit of more than $330 million dollars as of June 30, 1953 according to the Commission figures. As an indication that the Hoover Commission was pulling no punches, the report shows that Hoover Dam, itself, would have run up a deficit of some $101 million if its financing had been figured under these criteria.

Federal power projects are frequently proclaimed to be a "yardstick" by which it is possible to measure the performance and rates of non-federal utilities. The adoption of the suggested criteria for federal financing of power projects would go a long way toward establishing a more valid "yardstick" by which privately owned electric utilities could be judged.

What the Commission offers in this instance is not a 36-in. yardstick because there are other essential expenses, such as selling, that are still omitted. But it comes as close as a public power project could.

TECHNICAL NOTES

Termites succumb in their tunnels when butt-treated cedar poles are flow-coated with 5%-pentachloraphenol-in-oil preservative. Average treating cost of $10 per pole is recovered in extension of pole life.

Sweden's 60-mile 100-kv dc 1,000-ton one-piece cable to the Isle of Gotland was transported longitudinally over rollers for two miles from the factory to the cable ship rather than coiled in 30 rail cars to be uncoiled and recoiled in the ship's hold.

Thorium as fuel for an atomic plant permits higher fuel temperature than is likely with uranium. Liquid sodium coolant converts this to improved steam conditions for the turbine.

Seventeen western states use some 77 billion gallons per day of water. Thirty one eastern states use practically the same amount.

Decibel loss of carrier caused by a power transformer can be estimated by substituting a long branch line or a shunt impedance of 500 ohms if coupled phase-to-phase, or 800 ohms if phase-to-neutral.

Aviary lighting switches fluorescent fixtures to provide for tropical birds the equivalent of tropical living. Full intensity approx²mates mid-day sunlight. Partial lighting simulates twilight to send the birds to rest, and a few units remain illuminated at night to create the illusion of tropical night and protect the birds from fright.

Florida PUC Dismisses Plea

Group of hotels and stores lose case which charged that Florida P&L's electric rates are unreasonable and excessive

The Florida Railroad & Public Utilities Commission has dismissed a complaint, against Florida Power & Light Co, by a group of hotels and stores which felt that they were entitled to a reduction in rates. The order was dated June 30.

In essence, the formal complaint alleged that the rates charged by FP&L were unreasonable, excessive, arbitrary, and discriminatory and that, consequently, the plaintiffs were entitled to a reduction of such charges.

In countering this complaint, the company asked the case be dismissed on the grounds (among others) that "the real party in interest to the complaint was not the complainants named therein but, in fact, a New York corporation known as National Utility Service, Inc., and/or Utility Analysis, Inc. . . ."

New York Firm Criticized

In its motion to dismiss the complaint the company characterized this rate bureau as one which ". . . had spread and fomented dissatisfaction among the complaining subscribers of respondent, and, as a result thereof, had been able to secure contracts with said complaining subscribers whereby Utility Service and Utility Analysis would receive one-half of whatever reductions or rebates could be forced upon said respondent; that this litigation before the commission was directly stirred up, excited, aroused, encouraged, and instigated by Utility Service and/or Utility Analysis for their own selfish and pecuniary gain in order that they might obtain for themselves a substantial portion of whatever funds they could compel respondent to pay to said complaining parties; that this action is the result of the champertous method and conduct of Utility Service and Utility Analysis who are attempting by this proceeding to use this commission to further their champertous ends and to assist them in illegally and unlawfully requiring respondent to reduce its rates in order unjustly to enrich themselves; . . ."

In analyzing the legal relationship between the rate bureau and its clients, the commission noted that "Typical provisions contained in contracts between various complaining parties herein and Utility Analysis Organization are found in the following excerpts taken from the agreement between said organization and the complainant New Yorker Hotel:

"1. That the organization proposes to make a complete technical investigation and analysis of the various factors in connection with existing utility rates; said organization agrees to discuss present and proposed rates with the utility company and, if necessary and practical, to present complaints to the Florida Railroad & Public Utilties Commission . . .

"3. In consideration of the sum of (heretofore paid) ($10.00), the hotel mentioned herein, with a capacity of 76 rooms, agrees to engage the services of the organization; that in addition to said sum, the hotel agrees to pay the organization fifty per cent (50%) of all refunds received from the utilities, together with fifty per cent (50%) of all savings on utility bills due to any reduction in rate or utility charges based upon recommendations made or action taken by organization or its assigns, associates or representatives for a period of (3) years from the effective date of such reduction or savings; . . .

"7. All costs including surveys and legal expenses to be borne by the organization."

In its findings the commission said: "The contracts, to which reference has been made herein, have all the elements of champerty, showing that Utility Service and Utility Analysis have undertaken to employ and pay attorneys and other experts, and pay all legal costs and expenses, in the servicing of said contracts for a share of any refunds obtained or any amounts saved by the complaining parties as consumers of electricty for a period of three years.

"Nothing appears in the formal complaint or in the contracts or in the record herein that the said Utility Service or Utility Analysis, at the time the contracts were executed or now, have any interest either direct or remote, present or contingent, in the subject matter of this proceeding. It is the unlawful maintainence of a proceeding growing out of a bargain to divide that which might be saved the complainants if they prevail, or the unlawful maintenance of a proceeding in consideration of some bargain to have a part of the thing in dispute or some profit out of it, that the law condemns."

Rate Investigations Expensive

The commission continued "General rate investigations of large utilities are time consuming and tremendously expensive for all parties concerned. Ultimately, of course, such expense must be borne by the rate payer.

Regardless of level of rates charged by any public utility there can always be found some customers who are dissatisfied with the rates they pay and who will be willing to seek a rate investigation and reduction of such rates when the immediate costs thereof will by borne by someone else," the Florida Commission order said.

Implications Cited

"It is not difficult to stir up and foment rate dissatisfaction when the intermeddler agrees to pay all costs incurred in bringing about a rate investigation on the promise that he will receive nothing more than a portion of any rebate or saving that may be obtained. If this scheme of developing rate investigations is recognized and encouraged, there will be no end to the investigations this commission will be called upon to conduct in order that such intermeddlers may remain in business. The appropriations which finance the operations and activities of this commission are limited in amount and could never support the constant and terrific drain which would result from the implementation of such a policy . . .", the commission order stated.

(*More Finance on page* 64)

FINANCIAL BRIEFS

Refusal of the underwriting syndicate to accept a $15 million revenue bond issue of Tacoma, Wash., City Light will not hold up construction of the utility's $146 million Cowlitz River hydro plant, Utilities Director Dean Barline has announced. Halsey, Stuart & Co cancelled the bond transaction, for which it was the successful bidder, when the city was unable to issue a non-litigation certificate because of two law suits now pending. A hearing is scheduled for August 8 in Thurston County Superior Court at Olympia in one suit, the petition of the State and Game Department for a permanent injunction against construction of the project. The other suit, seeking $80 million damages, was filed in federal court at Tacoma on behalf of the Cowlitz Indian Tribe.

Ohio Gov Frank J. Lausche has vetoed a bill to exempt public utilities and railroads from regulations of Planning Commission.

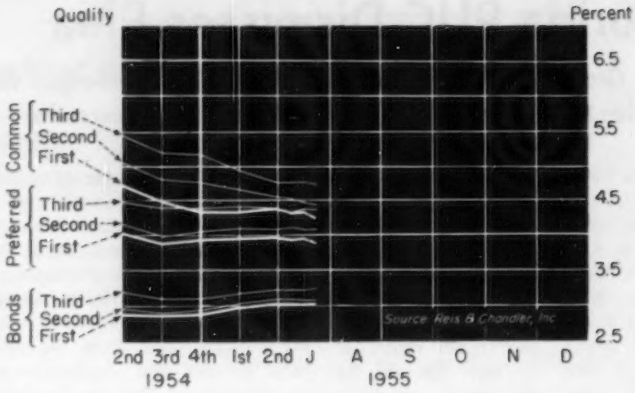
Central Louisiana Electric Co will pay August 15 a quarterly common dividend of 35¢ a share as compared with 30¢ a share in the previous quarter . . . **Southeastern Electric Service Co** will pay September 15 a quarterly common stock dividend of 27¢ a share versus 25¢ a share previously.

Kuhn, Loeb & Co and Ladenburg, Thalmann & Co made the winning bid of 11.71¢ a share, for underwriting compensation for the purchase of any unsubscribed shares of the 373,689 shares of Consumers Power Co common stock not subscribed on the offer to the company's stockholders and employees at $45.25 a share.

Long Island Lighting Co stockholders subscribed for 97.3% of the 624,170 shares offered on a 1-for-10 basis at $20.50 a share. Balance of 16,564 shares were sold to underwriters. A simultaneous offering of 33,543 shares for subscription by employees, also at $20.50 a share, was oversubscribed.

Western Light & Telephone Co has sold $2.5 million of 3½% first mortgage bonds due in 1985 at par to six insurance companies . . . Blyth & Co is offering, as a secondary, 10,000 common shares of **Arizona Public Service Co** at $26.50 a share.

Today's Utility Yields—(%)



	BONDS			PREFERRED STOCKS			COMMON STOCKS		
QUALITY.....	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
July 21.....	3.04	3.08	3.22	3.94	4.06	4.36	4.27	4.42	4.71
July 14.....	3.03	3.08	3.21	3.96	4.06	4.36	4.34	4.45	4.76

Utility Earnings

COMPANY	PERIOD MONTHS ENDED		NET INCOME 1955	NET INCOME 1954	EARNINGS PER COMMON SHARE 1955	EARNINGS PER COMMON SHARE 1954
Carolina Power & Light.....	12	June	$8,613,650	$7,581,043	$...	$...
Central Hudson Gas & Electric.	12	June	3,346,120	2,817,175	1.02	0.97
Central Maine Power.....	12	June	6,499,625	5,477,472	2.04	1.79
Consolidated Edison of N. Y....	12	June	51,571,136	48,671,756	3.07	2.86
Detroit Edison.....	12	June	24,602,495	20,858,638	2.28	1.94
Interstate Power.....	12	June	2,779,910	2,495,764	1.09	0.93
Minnesota Power & Light.....	12	June	3,671,388	3,727,018	1.80	1.83
Oklahoma Gas & Electric.....	12	June	7,800,326	5,841,227	2.17(a)	1.80(a)
Portland General Electric.....	12	June	4,798,165	4,048,470	1.60	1.35
Southern Co.....	12	June	24,416,447	22,585,388	1.35	1.24

Notes—(a) Based on 2,984,783 shares in 1955 and 2,653,140 shares in 1954.

Utility Financing

COMPANY AND DESCRIPTION	AMOUNT OF OFFERING (000)	OFFERING PRICE	YIELD TO PUBLIC
JULY 21-27			
PREFERRED STOCK			
Consumers Power—100,000 sh $4.16 cum no par.....	$10,000	$101.00	4.12%
Southern Colorado Power—20,000 sh $50 par 4.72% cum	1,000	51.50	4.58
SCHEDULE FOR AUGUST—SEPTEMBER			
BONDS			BID DATE
California Electric Power—1st mtg.....	$6,000	.....	Aug. 30
Utah Power & Light 1st mtg due 1985.....	15,000	.....	Sept. 13
Ohio Power—1st mtg.....	17,000	.....	Sept. 20
Pacific Power & Light—1st mtg.....	10,000	.....	Sept. 27
Essex County Electric—1st mtg.....	18,000	.....	.....
PREFERRED STOCK			
Public Service Electric & Gas—250,000 sh $100 par....	$25,000	.....	.....
Ohio Power—60,000 sh $100 par.....	6,000	.....	Sept. 20
COMMON STOCK			
California Electric Power—230,000 sh.....	.....	.....	Aug. 23
Housatonic Public Service—14,817 sh (to be offered commonholders on 1-for-25 basis, record Sept. 5 to expire Sept. 26).....	.....	.....	.....
Utah Power & Light—177,500 sh.....	.....	.....	Sept. 13

AERIAL LUG CLAMPED TO SPUN COPPER HOOD TO COMPLETE INSTALLATION
VENT SCREW SOLDERED OVER AFTER FILLING
TAPERED PIPE PLUG TIGHTENED BY ALLEN WRENCH INSERTED THROUGH VENT HOLE
SLOTTED STEM EXPANDED AGAINST HOOD BY TAPERED PIPE PLUG
SPUN COPPER HOOD
SOLDER HOLE
CONDUCTOR
FACTORY SOLDERSEAL

Permanent electrical connection is quickly, easily accomplished by installer using Allen wrench. Tapered pipe plug is screwed down into the stem, expanding the stem against the inside of the hood and making the connection.

THIS EXCLUSIVE* ANACONDA SOLDERSEALED POTHEAD

GIVES YOU A SOUNDER CONNECTION NOW — SIMPLIFIES RELOCATION LATER!

If you have gasket leak problems, now is the time to end them forever—with Anaconda Soldersealed Potheads. They have no gaskets. All connections are soldered.

And now—a new method of making cable connections in these potheads adds *two more advantages* that no other pothead can give you.

SOUNDER CONNECTIONS BECAUSE:

1. Mechanical support for the cable is permanently achieved immediately after stem is inserted in hood, thereby preventing misalignment of cable during wiping and filling operations.

2. Permanent electrical connection is achieved when the stem is inserted in the copper hood. Compound is prevented from flowing between the stem and hood during filling operation and from interfering with the electrical connection.

3. Less chance of faulty field connection. "Double-action" electrical connection is achieved by expanding the slotted stem against the inside of the copper hood and by the clamping action of aerial lug on the outside of the hood.

EASIER RELOCATION BECAUSE:

1. Connection between the stem and the copper hood can be broken by merely loosening the tapered pipe plug and withdrawing the cable.

2. Pothead can be salvaged without repairs on the copper hood since the initial connection is made without crushing the hood.

Anaconda Soldersealed Potheads are available in 1/c type up to 46kv for indoor or outdoor service—stocked, ready for delivery. Now get both your power cable and Soldersealed Potheads from Anaconda. The Man from Anaconda is ready to give you all the details. Or write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

*Pat. applied for

SEE THE MAN FROM

ANACONDA®

ABOUT YOUR SOLDERSEALED POTHEADS

STATISTICS

The Price of Electricity in Key Cities throughout the country . . .

Akron	$6.30	Indianapolis	$6.65	New Orleans	$6.83	Salt Lake City	$6.68
Baltimore	7.79	*Knoxville	5.00	New York	8.33	San Francisco	6.44
Boston	9.39	Lawrence	8.96	*Omaha	6.47	*Seattle	4.40
Charleston (S.C.)	7.28	Little Rock	8.53	Philadelphia	6.48	Spokane	4.61
Cincinnati	6.59	*Los Angeles	4.90	Phoenix	7.30	*Springfield (Ill)	4.80
Cleveland	6.73	Louisville	5.60	Pittsburgh	6.95	*Tacoma	3.20
Dallas	6.86	Miami	7.92	Portland (Oreg)	5.25	Toledo	6.50
Denver	6.00	Milwaukee	6.03	Providence	8.85	Tulsa	7.69
Des Moines	6.87	Minneapolis	7.84	St. Louis	6.56	Washington	5.84
Detroit	7.74	Mobile	5.60	St. Paul	8.13	Wilmington	8.00

*publicly owned utility

Source: Federal Power Commission — Net Monthly 250 Kwhr Residential Electric Bill as of Jan. 1, 1955.

The nation-wide average residential bill for 250 kwhr a month usage (representing small appliances, lighting, refrigeration and cooking) totalled $7.03 on the first of this year. This continues a slight upward trend in evidence since 1952, but is lower than the $7.05 recorded in 1940, the $10.31 of 1930, and the $12.86 of 1925.

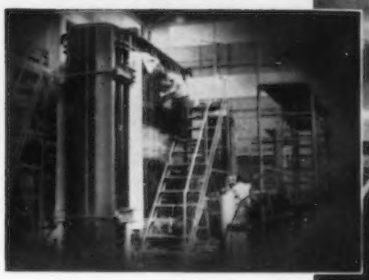
Annual usage city by city during 1953 (latest available year) varied from a high of 7,244 kwhr per customer in Tacoma, Washington, to a low of 1,067 kwhr in Lawrence, Mass. Nation-wide average for cities of 50,000 population or above was 2,115 kwhr.

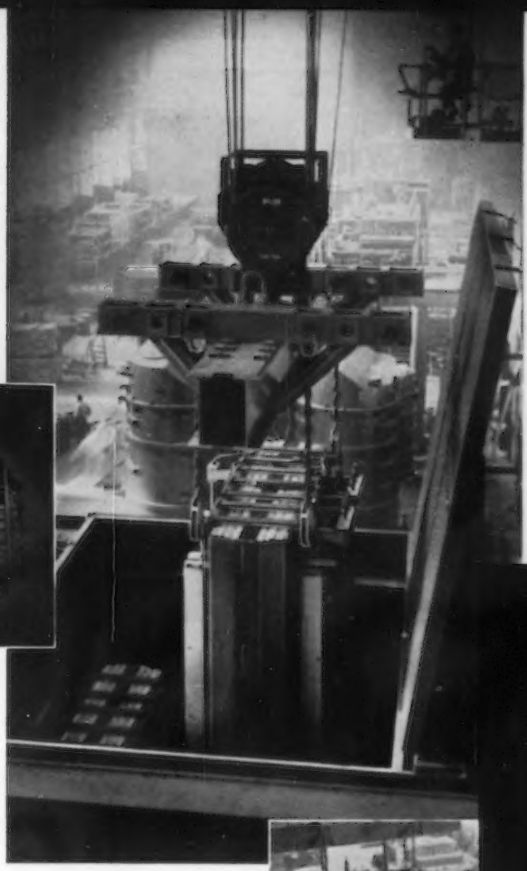
Power Statistics . . .

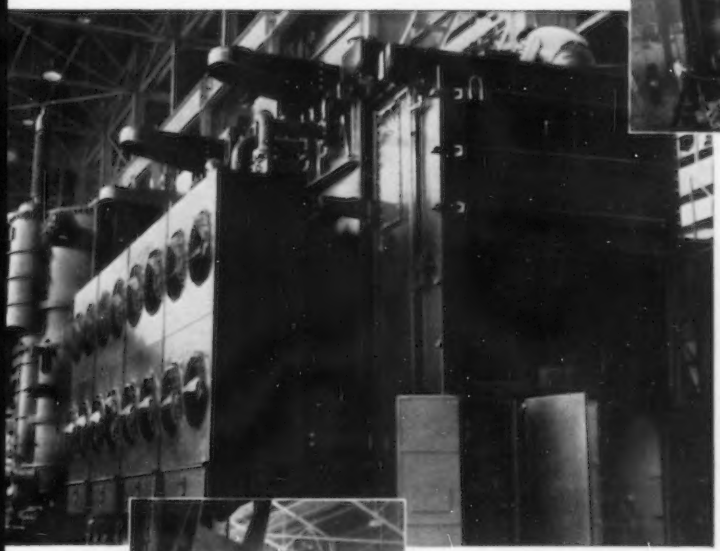
		Latest Month	Preceding Month	Year Ago	Annual Change %
Capacity	May	106.32	105.30	93.81	13.3
Peak—Class I Systems, million kw	May	83.9	82.4	74.0	13.4
Estimated Dec. '55 Peak	Mar.	96.5	96.4	96.0	0.6
Production—billion kwhr	May	43.35	42.03	37.43	15.8
hydro		9.81	10.47	10.35	−5.1
fuel		33.54	31.56	27.08	23.8
Sales—billion kwhr	Apr.	39.56	39.94	34.13	15.9
residential		10.54	11.08	9.57	10.1
commercial		6.14	6.20	5.69	7.9
industrial—includes sales to AEC		20.51	20.36	16.73	22.6
other		2.37	2.29	2.12	11.6
Fuel Consumption	May				
coal—million tons		10.76	10.12	8.67	24.1
oil—million barrels		4.88	5.68	4.25	14.9
gas—billion cu ft		103.43	92.82	94.70	9.3
Net Income Class A & B Co's—$ million	Apr.	105.46	107.80	95.87	10.0
Residential Customers—millions	12 mos.	43.44	43.35	42.15	3.1
revenue per kwhr	ended	2.68¢	2.68¢	2.72¢	−1.5
avg. kwhr per customer	Mar.	2,606	2,587	2,400	8.6
avg. annual bill		$69.84	$69.33	$65.28	7.0

Business Statistics . . .

Indexes: 1947–49 = 100					
FRB Industrial Production	June	138	138	124	11.3
ENR Construction Cost	June	137.5	137.0	130.5	5.4
BLS Cost-of-Living	May	114.2	114.2	115.0	−0.7
NEMA Sales	May				
insulation materials		154	160	116	32.8
electric appliances		110	105	89	23.6
household refrigerators		104	96	74	40.5
Wholesale prices	June				
motors and generators		120.8	120.8	123.7	−2.3
transformers and regulators		127.3	127.3	128.1	−0.6
switchgear and fuses		135.6	135.6	135.1	0.4
GNP—annual rate—$ billion	2nd Qtr.	$383.0	$375.3	$357.6	7.1







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